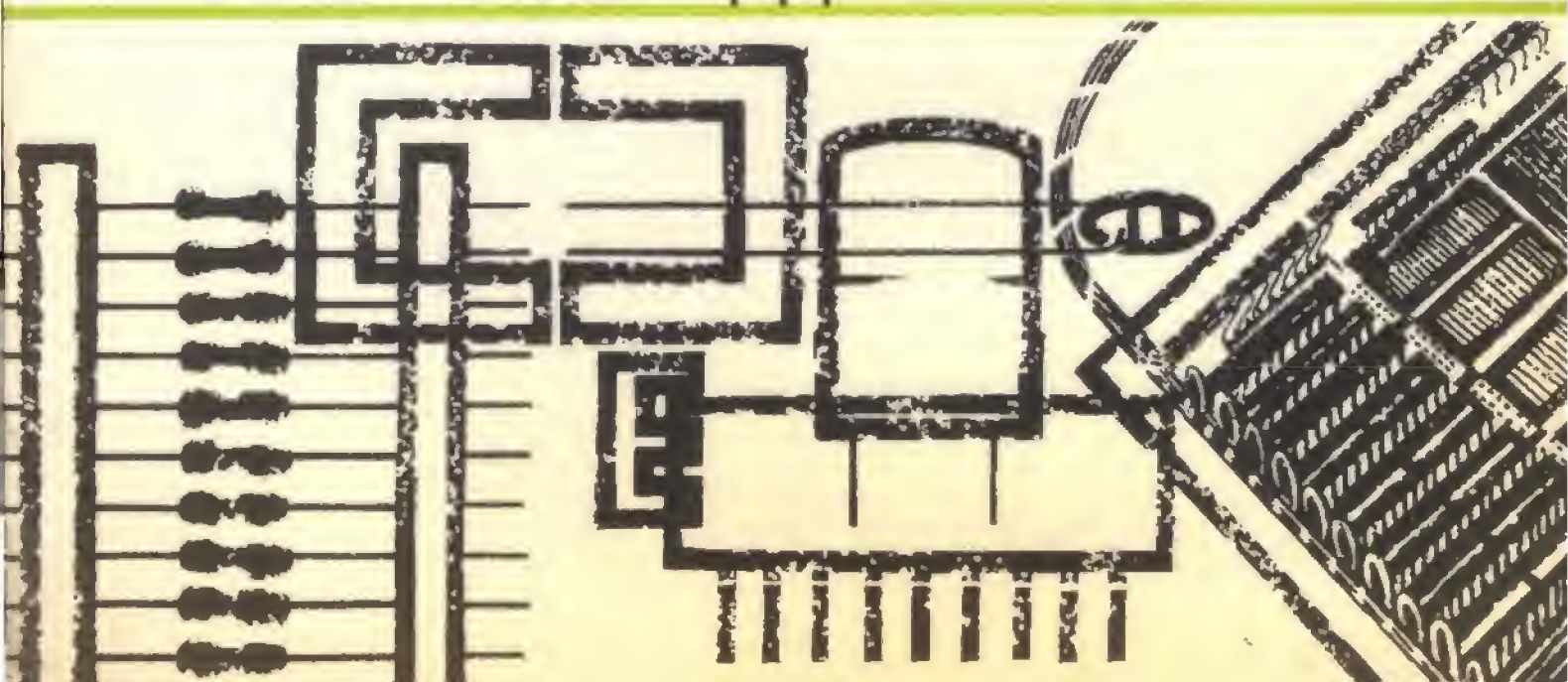
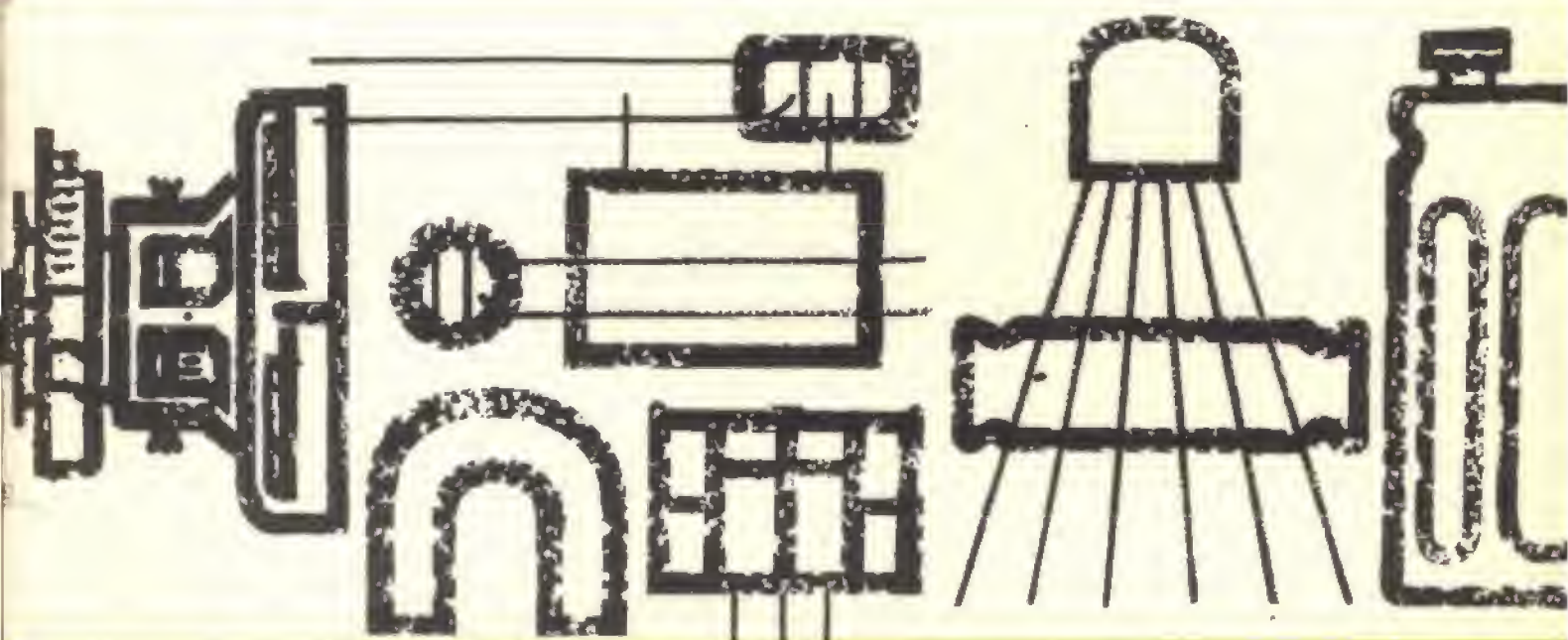


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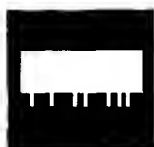
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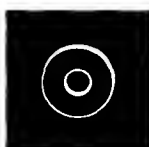


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Passive components quick reference guide 1974/75

This guide presents quick reference data on Mullard passive components.

Product information is deliberately abbreviated to give a rapid appreciation of salient characteristics, and to enable the performance of similar types to be compared quickly.

Full technical data on individual products, and details of the Mullard Technical Handbook, may be obtained from
Central Technical Services
Mullard Limited
New Road
Mitcham Surrey CR4 4XY
Telephone 01-648 3471 Telex 22194

For the convenience of Handbook users, the relevant book and part numbers are indicated at the top of each data table in the guide; data sheets for some new components may still be in preparation.

Mullard technical information service

Quick reference information

The most important characteristics of the current ranges of Mullard passive components are given in this guide.

Full technical data

Individual data sheets, giving full technical data on each product are readily available, and may be obtained by quoting the relevant type number.

In addition, laboratory reports, applications reports and technical publications of many kinds are regularly issued.

Technical Handbook system

The Mullard Technical Handbook system of data is made up of three sets of books, each comprising several parts. The three sets of books, easily identifiable by the colours of their covers, are as follows:

Book 1 (blue)	Semiconductor devices and integrated circuits
Book 2 (orange)	Valves and tubes
Book 3 (green)	Components materials and assemblies

New editions are issued at approximately yearly intervals.

New product information

As a further part of the information service, advance details of each new product or technique are published in the Mullard Bulletin, which is sent automatically to people who have asked to be kept informed of new introductions.

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*Available for current production ; not intended for new designs

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*Available for current production ; not intended for new designs

conversion list— code numbers to Mullard type numbers

For customers receiving
our components under
a Mullard code
number, a conversion
list to type numbers
is given.

Capacitors

Code number	Type number	Code number	Type number
2222 101 12161	C428AR/B160	2222 341 05154	C281VV/A150K
2222 101 12259	C428AR/B25	2222 341 05155	C281VV/A1M5
2222 101 12321	C428AR/B320	2222 341 05223	C281VV/A22K
2222 101 12509	C428AR/B50	2222 341 05224	C281VV/A220K
2222 101 12809	C428AR/B80	2222 341 05225	C281VV/A2M2
2222 101 13131	C428AR/C125	2222 341 05333	C281VV/A33K
2222 101 13209	C428AR/C20	2222 341 05334	C281VV/A330K
2222 101 13251	C428AR/C250	2222 341 05473	C281VV/A47K
2222 101 13409	C428AR/C40	2222 341 05474	C281VV/A470K
2222 101 13649	C428AR/C64	2222 341 05683	C281VV/A68K
2222 101 14101	C428AR/D100	2222 341 05684	C281VV/A680K
2222 101 14169	C428AR/D16	2222 341 59103	C281CD/A10K
2222 101 14201	C428AR/D200	2222 341 59104	C281CD/A100K
2222 101 14329	C428AR/D32	2222 341 59153	C281CD/A15K
2222 101 14509	C428AR/D50	2222 341 59154	C281CD/A150K
2222 101 15109	C428AR/E10	2222 341 59223	C281CD/A22K
2222 101 15131	C428AR/E125	2222 341 59224	C281CD/A220K
2222 101 15209	C428AR/E20	2222 341 59333	C281CD/A33K
2222 101 15329	C428AR/E32	2222 341 59334	C281CD/A330K
2222 101 15649	C428AR/E64	2222 341 59473	C281CD/A47K
2222 101 16139	C428AR/F12-5	2222 341 59474	C281CD/A470K
2222 101 16209	C428AR/F20	2222 341 59683	C281CD/A68K
2222 101 16409	C428AR/F40	2222 341 89103	C281AB/A10K
2222 101 16648	C428AR/F6-4	2222 341 89105	C281AB/A1M
2222 101 16809	C428AR/F80	2222 341 89153	C281AB/A15K
2222 101 17139	C428AR/G12-5	2222 341 89155	C281AB/A1M5
2222 101 17259	C428AR/G25	2222 341 89223	C281AB/A22K
2222 101 17408	C428AR/G4	2222 341 89333	C281AB/A33K
2222 101 17509	C428AR/G50	2222 341 89473	C281AB/A47K
2222 101 17808	C428AR/G8	2222 341 89683	C281AB/A68K
2222 101 18169	C428AR/H16	2222 341 89104	C281AB/A100K
2222 101 18258	C428AR/H2-5	2222 341 89154	C281AB/A150K
2222 101 18329	C428AR/H32	2222 341 89224	C281AB/A220K
2222 101 18508	C428AR/H5	2222 341 89225	C281AB/A2M2
2222 101 18808	C428AR/H8	2222 341 89334	C281AB/A330K
		2222 341 89474	C281AB/A470K
		2222 341 89684	C281AB/A680K
2222 311 31103	C296AA/A10K	2222 342 44103	C280AE/P10K
2222 311 31104	C296AA/A100K	2222 342 44104	C280AE/P100K
2222 311 31105	C296AA/A1M	2222 342 44153	C280AE/P15K
2222 311 31153	C296AA/A15K	2222 342 44154	C280AE/P150K
2222 311 31154	C296AA/A150K	2222 342 44223	C280AE/P22K
2222 311 31223	C296AA/A22K	2222 342 44224	C280AE/P220K
2222 311 31224	C296AA/A220K	2222 342 44333	C280AE/P33K
2222 311 31333	C296AA/A33K	2222 342 44473	C280AE/P47K
2222 311 31334	C296AA/A330K	2222 342 44683	C280AE/P68K
2222 311 31473	C296AA/A47K	2222 342 45105	C280AE/A1M
2222 311 31474	C296AA/A470K	2222 342 45155	C280AE/A1M5
2222 311 31683	C296AA/A68K	2222 342 45225	C280AE/A2M2
2222 311 31684	C296AA/A680K	2222 342 45334	C280AE/A330K
2222 311 51102	C296AC/A1K	2222 342 45474	C280AE/A470K
2222 311 51103	C296AC/A10K	2222 342 45684	C280AE/A680K
2222 311 51104	C296AC/A100K	2222 342 54103	C280CF/P10K
2222 311 51152	C296AC/A1K5	2222 342 54104	C280CF/P100K
2222 311 51153	C296AC/A15K	2222 342 54153	C280CF/P15K
2222 311 51154	C296AC/A150K	2222 342 54154	C280CF/P150K
2222 311 51222	C296AC/A2K2	2222 342 54223	C280CF/P22K
2222 311 51223	C296AC/A22K	2222 342 54224	C280CF/P220K
2222 311 51224	C296AC/A220K	2222 342 54333	C280CF/P33K
2222 311 51332	C296AC/A3K3	2222 342 54473	C280CF/P47K
2222 311 51333	C296AC/A33K	2222 342 54683	C280CF/P68K
2222 311 51334	C296AC/A330K	2222 342 55105	C280CF/A1M
2222 311 51472	C296AC/A4K7	2222 342 55334	C280CF/A330K
2222 311 51473	C296AC/A47K	2222 342 55474	C280CF/A470K
2222 311 51474	C296AC/A470K	2222 342 55684	C280CF/A680K
2222 311 51682	C296AC/A6K8		
2222 311 51683	C296AC/A68K		
2222 341 05103	C281VV/A10K	2222 435 41004	C295AH/D100K
2222 341 05104	C281VV/A100K	2222 435 41104	C295AH/D110K
2222 341 05105	C281VV/A1M	2222 435 41204	C295AH/D120K
2222 341 05153	C281VV/A15K	2222 435 41304	C295AH/D130K

Code number	Type number	Code number	Type number	Code number	Type number
2222 435 41504	C295AH/D150K	2222 632 34121	C333CC/C120E	2322 610 11131	VA1040
2222 435 41604	C295AH/D160K	2222 632 34151	C333CC/C150E	2322 610 11132	VA1038
2222 435 41803	C295AH/D16K	2222 632 34229	C333CC/C22E	2322 610 11159	VA1100
2222 435 42003	C296AH/D20K	2222 632 34279	C333CC/C27E	2322 610 11228	VA1066
2222 435 42203	C295AH/D22K	2222 632 34339	C333CC/C33E	2322 610 11408	VA1033
2222 435 42403	C295AH/D24K	2222 632 34399	C333CC/C39E	2322 610 11501	VA1039
2222 435 42703	C295AH/D27K	2222 632 34479	C333CC/C47E	2322 610 11509	VA1034
2222 435 43003	C295AH/D30K	2222 632 34569	C333CC/C56E	2322 610 11608	VA1074
2222 435 43303	C295AH/D33K	2222 632 34689	C333CC/C68E	2322 610 11808	VA1053
2222 435 43603	C295AH/D36K	2222 632 34829	C333CC/C82E	2322 610 90043	VA1100
2222 435 43903	C295AH/D39K	2222 632 58181	C333CH/C160E		
2222 435 49103	C295AH/D91K	2222 632 58221	C333CH/C220E	2322 619 90002	VA1037
		2222 632 58271	C333CH/C270E	2322 619 90003	VA1077
		2222 632 58331	C333CH/C330E		
2222 436 41003	C295AA/D10K	2222 802 20001	COO4EA/3E	2322 627 11102	VA3700
2222 436 41103	C295AA/D11K	2222 802 20002	COO4EA/6E	2322 627 11103	VA3706
2222 436 41203	C295AA/D12K	2222 802 20004	COO4EA/12E	2322 627 11104	VA3712
2222 436 41303	C295AA/D13K	2222 802 20005	COO4EA/18E	2322 627 11222	VA3702
2222 436 41503	C295AA/D15K			2322 627 11223	VA3708
2222 436 41603	C295AA/D16K			2322 627 11224	VA3714
2222 436 42703	C295AA/D27K			2322 627 11472	VA3704
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2222 436 44302	C295AA/D43K			2322 627 21104	VA3412
2222 436 44303	C295AA/D43K			2322 627 21222	VA3402
2222 436 44702	C295AA/D47K			2322 627 21224	VA3414
2222 436 44703	C295AA/D47K			2322 627 21472	VA3404
2222 436 45102	C296AA/D5K1			2322 627 21473	VA3410
2222 436 45103	C295AA/D51K				
2222 436 45602	C295AA/D56K			2322 634 11102	VA3100
2222 436 45603	C295AA/D56K			2322 634 11103	VA3106
2222 436 46202	C295AA/D62K			2322 634 11104	VA3112
2222 436 46203	C295AA/D62K			2322 634 11222	VA3102
2222 436 46802	C295AA/D68K			2322 634 11223	VA3108
2222 436 46803	C295AA/D68K			2322 634 11224	VA3114
2222 436 47502	C295AA/D75K			2322 634 11472	VA3104
2222 436 47503	C295AA/D75K			2322 634 11473	VA3110
2222 436 48202	C295AA/D82K			2322 634 11474	VA3116
2222 436 48203	C295AA/D82K			2322 634 21102	VA3200
2222 436 49102	C295AA/D9K1			2322 634 21103	VA3206
				2322 634 21104	VA3212
2222 438 41302	C295AC/D1K3			2322 634 21222	VA3202
2222 438 41502	C295AC/D1K5			2322 634 21223	VA3206
2222 438 41602	C295AC/D1K6			2322 634 21224	VA3214
2222 438 41802	C295AC/D1K8			2322 634 21472	VA3204
2222 438 41803	C295AC/D16K			2322 634 21473	VA3210
2222 438 42002	C296AC/D2K			2322 634 21474	VA3216
2222 438 42003	C295AC/D20K				
2222 438 42202	C295AC/D2K2			2322 635 01153	VA1055S
2222 438 42203	C295AC/D22K			2322 635 01154	VA1067S
2222 438 42402	C295AC/D2K4			2322 635 01472	VA1066S
2222 438 42403	C295AC/D24K			2322 635 01473	VA1058S
2222 438 42702	C295AC/D2K7				
2222 438 43002	C295AC/D3K			2322 642 11151	VA1096
2222 438 43302	C295AC/D3K3			2322 642 11152	VA1096
2222 438 43602	C295AC/D3K6			2322 642 11153	VA1106
2222 438 43902	C295AC/D3K9			2322 642 11222	VA1106
				2322 642 11471	VA1097
2222 632 09188	C333CB/N1E8			2322 642 12223	VA1112
2222 632 09228	C333CB/N2E2			2322 642 12333	VA1111
2222 632 09278	C333CB/N2E7			2322 642 12472	VA1109
2222 632 09338	C333CB/N3E3				
2222 632 09398	C333CB/N3E9	2322 564 02582	E296ED/A256	2322 644 11471	VA1103
2222 632 09478	C333CB/N4E7	2322 564 02602	E296ED/A260	2322 644 90005	VA1104
2222 632 09568	C333CB/N5E6	2322 564 02622	E296ED/A262		
2222 632 09688	C333CB/N6E6	2322 564 02681	E296ED/P266		
2222 632 09828	C333CB/N6E2	2322 564 22582	E296CD/A258		
2222 632 10109	C333CB/N10E	2322 564 90004	E296ZZ/05	2322 661 91002	E220ZZ/03
2222 632 10129	C333CB/C12E	2322 564 90005	E298ZZ/06	2322 661 91003	E220ZZ/04
2222 632 10159	C333CB/C15E	2322 564 90014	E298ED/A265	2322 661 91004	E220ZZ/02
2222 632 10189	C333CB/C18E			2322 661 91005	E220ZZ/01
2222 632 34101	C333CC/C100E	2322 574 90001	E295ZZ/01		
		2322 574 90002	E295ZZ/02	2322 662 93037	VA8650



Metallised film capacitors

*p.e.t.p. book 3 part 1

C280AE (342) Series 250V d.c. working

Type No.	Code No.	Capacitance		Dimensions mm						Colour code†		
		μF	S	L	T	H	d	ϕ		Band 1	Band 2	Band 3
C280AE/P10K	342 44103	0.01	10.2	12.5	4	9	0.6	16		Brown	Black	Orange
C280AE/P15K	342 44153	0.015	10.2	12.5	4	9	0.6	16		Brown	Green	Orange
C280AE/P22K	342 44223	0.022	10.2	12.5	4	9	0.6	16		Red	Red	Orange
C280AE/P33K	342 44333	0.033	10.2	12.5	4	9	0.6	16		Orange	Orange	Orange
C280AE/P47K	342 44473	0.047	10.2	12.5	4	9	0.6	16		Yellow	Violet	Orange
C280AE/P68K	342 44683	0.068	10.2	12.5	5	10	0.6	16		Blue	Grey	Orange
C280AE/P100K	342 44104	0.1	10.2	12.5	6	11	0.6	16		Brown	Black	Yellow
C280AE/P150K	342 44154	0.15	15.3	17.5	6	11	0.8	18		Brown	Green	Yellow
C280AE/P220K	342 44224	0.22	15.3	17.5	7	12	0.8	18		Red	Red	Yellow
C280AE/A330K	342 45334	0.33	20.3	22.5	6.5	11.5	0.8	21		Orange	Orange	Yellow
C280AE/A470K	342 45474	0.47	20.3	22.5	7.5	12.5	0.8	21		Yellow	Violet	Yellow
C280AE/A680K	342 45684	0.68	20.3	22.5	9.5	14.5	0.8	21		Blue	Grey	Yellow
C280AE/A1M	342 45105	1	27.9	30	9.5	14.5	0.8	21		Brown	Black	Green
C280AE/A1M5	342 45155	1.5	27.9	30	10.5	18	0.8	21		Brown	Green	Green
C280AE/A2M2	342 45225	2.2	27.9	30	12.5	20.5	0.8	21		Red	Red	Green

*p.e.t.p. book 3 part 1

C280CF (342) Series 400V d.c. working

Type No.	Code No.	Capacitance		Dimensions mm						Colour code†		
		μF	S	L	T	H	d	ϕ		Band 1	Band 2	Band 3
C280CF/P10K	342 54103	0.01	10.2	12.5	4	9	0.6	16		Brown	Black	Orange
C280CF/P15K	342 54153	0.015	10.2	12.5	4	9	0.6	16		Brown	Green	Orange
C280CF/P22K	342 54223	0.022	10.2	12.5	4	9	0.6	16		Red	Red	Orange
C280CF/P33K	342 54333	0.033	10.2	12.5	5	10	0.6	16		Orange	Orange	Orange
C280CF/P47K	342 54473	0.047	10.2	12.5	6	11	0.6	16		Yellow	Violet	Orange
C280CF/P68K	342 54683	0.068	15.3	17.5	6	11	0.8	18		Blue	Grey	Orange
C280CF/P100K	342 54104	0.1	15.3	17.5	7	12	0.8	18		Brown	Black	Yellow
C280CF/P150K	342 54154	0.15	20.3	22.5	6.5	11.5	0.8	21		Brown	Green	Yellow
C280CF/P220K	342 54224	0.22	20.3	22.5	7.5	12.5	0.8	21		Red	Red	Yellow
C280CF/A330K	342 55334	0.33	20.3	22.5	9.5	14.5	0.8	21		Orange	Orange	Yellow
C280CF/A470K	342 55474	0.47	27.9	30	9.5	14.5	0.8	21		Yellow	Violet	Yellow
C280CF/A680K	342 55684	0.68	27.9	30	10	18	0.8	21		Blue	Grey	Yellow
C280CF/A1M	342 55105	1	27.9	30	12	20	0.8	21		Brown	Black	Green

*Polyethylene terephthalate

Packing quantity: Multiples of 1000 pieces

†Colour code reads from the top of the component.

Fourth band denotes tolerance: White $\pm 10\%$ Black $\pm 20\%$

Fifth band denotes working voltage: Red 250V Yellow 400V

Capacitance tolerance

for $C \leq 0.22 \mu\text{F} \pm 20\%$

for $C > 0.33 \mu\text{F} \pm 10\%$

Losses (at 1kHz)

$\tan \delta < 75 \times 10^{-4}$

Insulation resistance at 20°C for $C \leq 0.33 \mu\text{F}$ $R > 30\,000\,\text{M}\Omega$

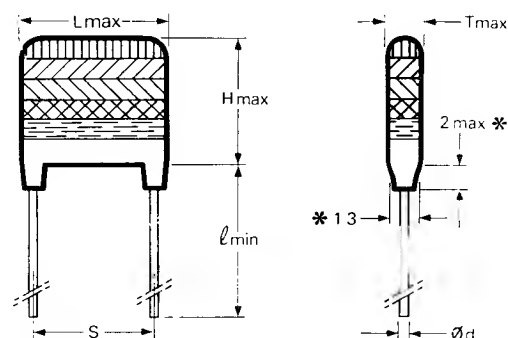
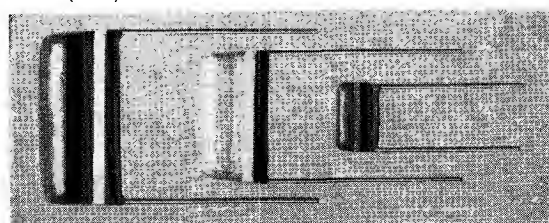
for $C > 0.47 \mu\text{F}$ $RC > 10\,000\,\text{M}\Omega\mu\text{F}$

Temperature range

-40 to +85°C

C280 Series capacitors are also available with crimped and cropped leads to suit 2.54 mm (0.1 in) printed wiring grid, these are supplied under C280 (352) Series.

C280 (342)



*Lacquer extends 2 max from position where diameter is 1.3



Metallised film capacitors

*p.e.t.p. book 3 part 1

C281VV and C281AB (341) Series 250V d.c. working									
Post Office		Commercial		Capacitance μF	Dimensions mm				
Type No.	Code No.	Type No.	Code No.		L	T	H	d	ℓ
C281VV/A10K	341 05103	C281AB/A10K	341 89103	0.01	14.6	4.8	8.8	0.8	40
C281VV/A15K	341 05153	C281AB/A15K	341 89153	0.015	14.6	4.8	8.8	0.8	40
C281VV/A22K	341 05223	C281AB/A22K	341 89223	0.022	14.6	4.8	8.8	0.8	40
C281VV/A33K	341 05333	C281AB/A33K	341 89333	0.033	14.6	4.8	8.8	0.8	40
C281VV/A47K	341 05473	C281AB/A47K	341 89473	0.047	14.6	4.8	8.8	0.8	40
C281VV/A68K	341 05683	C281AB/A68K	341 89683	0.068	14.6	5.6	9.5	0.8	40
C281VV/A100K	341 05104	C281AB/A100K	341 89104	0.1	14.6	6.6	10.5	0.8	40
C281VV/A150K	341 05154	C281AB/A150K	341 89154	0.15	18.1	6.6	10.5	0.8	40
C281VV/A220K	341 05224	C281AB/A220K	341 89224	0.22	18.1	7.7	11.6	0.8	40
C281VV/A330K	341 05334	C281AB/A330K	341 89334	0.33	23.6	7.5	11.6	0.8	40
C281VV/A470K	341 05474	C281AB/A470K	341 89474	0.47	23.6	8.8	12.9	0.8	40
C281VV/A680K	341 05684	C281AB/A680K	341 89684	0.68	23.6	10.5	14.5	0.8	40
C281VV/A1M	341 05105	C281AB/A1M	341 89105	1	31.1	10.5	14.7	1	49
C281VV/A1M5	341 05155	C281AB/A1M5	341 89155	1.5	31.1	12.5	19.6	1	49
C281VV/A2M2	341 05225	C281AB/A2M2	341 89225	2.2	31.1	15.1	22.1	1	49

C281VV are approved to Post Office specification D2283 and marked with Post Office type number 8017B
RRE approved to DEF5041
*Polyethylene terephthalate

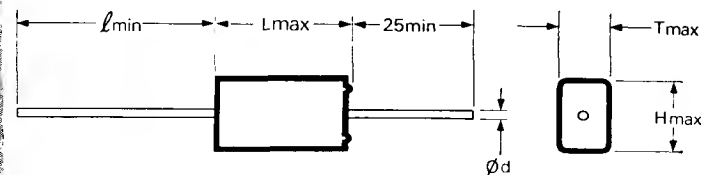
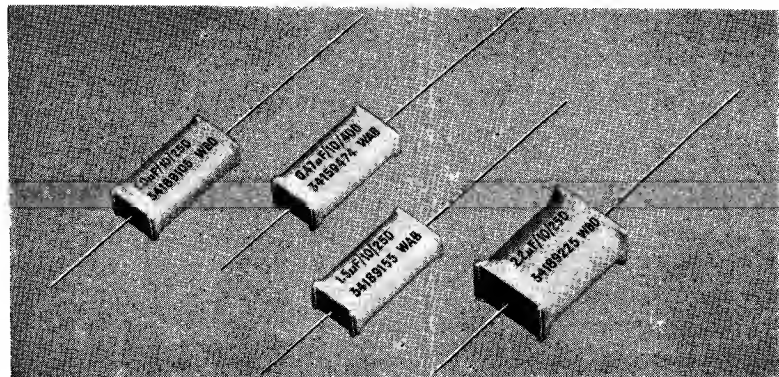
polycarbonate book 3 part 1

C281CD (341) Series 400V d.c. working							
Type No.	Code No.	Capacitance μF	Dimensions mm				ℓ
			L	T	H	d	
C281CD/A10K	341 59103	0.01	14.6	4.8	8.8	0.8	40
C281CD/A15K	341 59153	0.015	14.6	4.8	8.8	0.8	40
C281CD/A22K	341 59223	0.022	14.6	4.8	8.8	0.8	40
C281CD/A33K	341 59333	0.033	14.6	5.6	9.5	0.8	40
C281CD/A47K	341 59473	0.047	14.6	6.6	10.5	0.8	40
C281CD/A68K	341 59683	0.068	18.1	6.6	10.5	0.8	40
C281CD/A100K	341 59104	0.1	18.1	7.7	11.6	0.8	40
C281CD/A150K	341 59154	0.15	23.6	7.5	11.6	0.8	40
C281CD/A220K	341 59224	0.22	23.6	8.8	12.9	0.8	40
C281CD/A330K	341 59334	0.33	23.6	10.5	14.5	0.8	40
C281CD/A470K	341 59474	0.47	31.1	10.5	14.7	1	49

Packing quantity : Multiples of 1000 pieces

Capacitance tolerance $\pm 10\%$
Losses (at 1kHz) $\tan \delta$ (C281VV and AB Series) $< 75 \times 10^{-4}$
(C281CD Series) $< 30 \times 10^{-4}$
Insulation resistance at 20°C for $C < 0.33 \mu F$ $R > 30\,000\,M\Omega$
for $C \geq 0.47 \mu F$ $R C > 10\,000\,M\Omega \mu F$
Temperature range -55 to $+85^\circ C$

C281 (341)





Metallised film capacitors

*p.e.t.p. or polycarbonate book 3 part 1

344 2 Series 100V d.c. working

Type No.		Capacitance μF	Dimensions mm			
P.E.T.P.	Polycarbonate		S	L	T	H
344 25473	344 21473	0.047	10	13	4.5	10
344 25683	344 21683	0.068	10	13	4.5	10
344 25104	344 21104	0.1	10	13	4.5	10
344 25154	344 21154	0.15	10	13	4.5	10
344 25224	344 21224	0.22	10	13	5	11
344 25334	344 21334	0.33	15	17.5	5	11
344 25474	344 21474	0.47	15	17.5	6	11.5
344 25684	344 21684	0.68	15	17.5	7	13
344 25105	344 21105	1	15	17.5	8.5	14.5
344 25155	344 21155	1.5	22.5	26	7.5	16.5
344 25225	344 21225	2.2	22.5	26	8.5	18
344 25335	344 21335	3.3	22.5	26	9.5	19
344 25475	344 21475	4.7	27.5	30	11	20.5
344 25685	344 21685	6.8	27.5	30	13.5	22

*p.e.t.p. book 3 part 1

344 4 Series 250V d.c. working

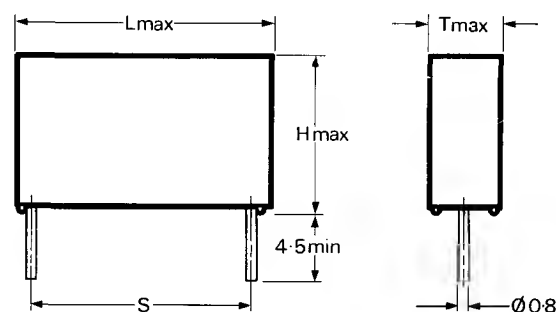
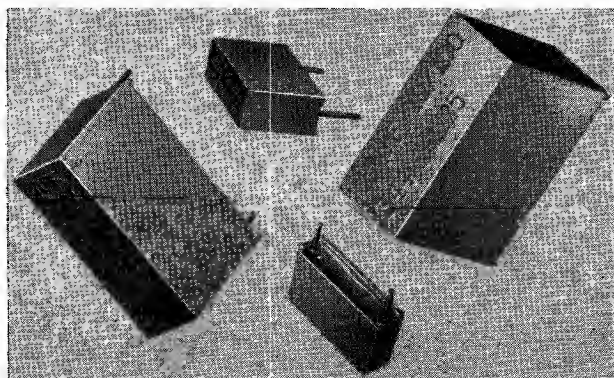
Type No.	Capacitance μF	Dimensions mm			
		S	L	T	H
344 41103	0.01	10	13	4.5	10
344 41153	0.015	10	13	4.5	10
344 41223	0.022	10	13	4.5	10
344 41333	0.033	10	13	4.5	10
344 41473	0.047	10	13	4.5	10
344 41683	0.068	10	13	5	11
344 41104	0.1	15	17.5	5	11
344 41154	0.15	15	17.5	6	11.5
344 41224	0.22	15	17.5	7	13
344 41334	0.33	15	17.5	8.5	14.5
344 41474	0.47	22.5	26	6.5	15.5
344 41684	0.68	22.5	26	7.5	16.5
344 41105	1	22.5	26	9.5	19
344 41155	1.5	27.5	30	11	20.5
344 41225	2.2	27.5	30	13.5	22
344 90901 P.O. type 8019A	0.9 $\pm 10\%$	22.5	26	9.5	19
344 90108 P.O. type 8022A	1.8 $\pm 15\%$	27.5	30	13.5	22

*Polyethylene terephthalate
Packing quantity: Multiples of 1000 pieces

The 344 2 and 344 4 Series have Post Office approval
and are RRE recommended

Capacitance tolerance $\pm 10\%$ unless otherwise stated
Temperature range -55 to $+85^\circ\text{C}$
Losses (at 1kHz) $\tan \delta < 30 \times 10^{-4}$ (344 21 ... only)
 $< 75 \times 10^{-4}$ (remainder)
Insulation resistance at 20°C for $C \leq 0.33 \mu\text{F}$ $R > 30\,000\,\text{M}\Omega$
for $C \geq 0.47 \mu\text{F}$ $R > 10\,000\,\text{M}\Omega \mu\text{F}$

344





Film/foil capacitors

moulded polystyrene (extended foil) book 3 part 1

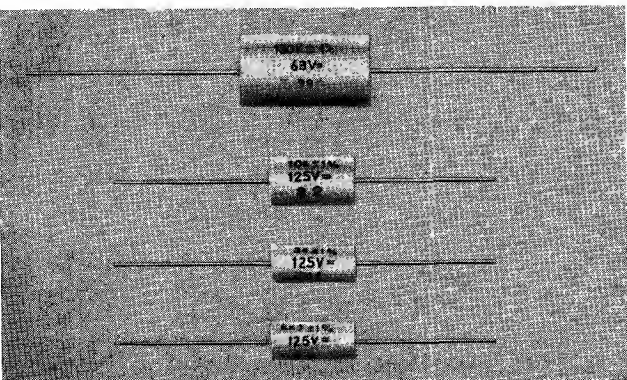
C295AH (435) Series 63V d.c. working									
Type No.	Code No.	Capacitance nF	Dimensions mm		Type No.	Code No.	Capacitance nF	Dimensions mm	
			D	L				D	L
C295AH/D18K	435 41803	18	10.1	15	C295AH/D39K	435 43903	39	12.6	15
C295AH/D20K	435 42003	20	10.1	15	C295AH/D91K	435 49103	91	12.6	25
C295AH/D22K	435 42203	22	10.1	15	C295AH/D100K	435 41004	100	15.1	25
C295AH/D24K	435 42403	24	10.1	15	C295AH/D110K	435 41104	110	15.1	25
C295AH/D27K	435 42703	27	12.6	15	C295AH/D120K	435 41204	120	15.1	25
C295AH/D30K	435 43003	30	12.6	15	C295AH/D130K	435 41304	130	15.1	25
C295AH/D33K	435 43303	33	12.6	15	C295AH/D150K	435 41504	150	15.1	25
C295AH/D36K	435 43603	36	12.6	15	C295AH/D160K	435 41604	160	15.1	25

C295AA (436) Series 125V d.c. working									
Type No.	Code No.	Capacitance nF	Dimensions mm		Type No.	Code No.	Capacitance nF	Dimensions mm	
			D	L				D	L
C295AA/D4K3	436 44302	4.3	7.6	15	C295AA/D16K	436 41603	16	12.6	15
C295AA/D4K7	436 44702	4.7	9.1	15	C295AA/D27K	436 42703	27	12.6	25
C295AA/D5K1	436 45102	5.1	9.1	15	C295AA/D30K	436 43003	30	12.6	25
C295AA/D5K6	436 45602	5.6	9.1	15	C295AA/D33K	436 43303	33	12.6	25
C295AA/D6K2	436 46202	6.2	9.1	15	C295AA/D36K	436 43603	36	12.6	25
C295AA/D6K8	436 46802	6.8	9.1	15	C295AA/D39K	436 43903	39	12.6	25
C295AA/D7K5	436 47502	7.5	9.1	15	C295AA/D43K	436 44303	43	12.6	25
C295AA/D8K2	436 48202	8.2	10.1	15	C295AA/D47K	436 44703	47	12.6	25
C295AA/D9K1	436 49102	9.1	10.1	15	C295AA/D51K	436 45103	51	12.6	25
C295AA/D10K	436 41003	10	10.1	15	C295AA/D56K	436 45603	56	15.1	25
C295AA/D11K	436 41103	11	12.6	15	C295AA/D62K	436 46203	62	15.1	25
C295AA/D12K	436 41203	12	12.6	15	C295AA/D68K	436 46803	68	15.1	25
C295AA/D13K	436 41303	13	12.6	15	C295AA/D75K	436 47503	75	15.1	25
C295AA/D15K	436 41503	15	12.6	15	C295AA/D82K	436 48203	82	15.1	25

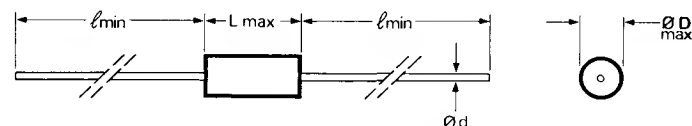
C295AC (438) Series 500V d.c. working									
Type No.	Code No.	Capacitance nF	Dimensions mm		Type No.	Code No.	Capacitance nF	Dimensions mm	
			D	L				D	L
C295AC/D1K3	438 41302	1.3	9.1	15	C295AC/D3K	438 43002	3.0	10.1	15
C295AC/D1K5	438 41502	1.5	9.1	15	C295AC/D3K3	438 43302	3.3	10.1	15
C295AC/D1K6	438 41602	1.6	9.1	15	C295AC/D3K6	438 43602	3.6	12.6	15
C295AC/D1K8	438 41802	1.8	9.1	15	C295AC/D3K9	438 43902	3.9	12.6	15
C295AC/D2K	438 42002	2.0	9.1	15	C295AC/D18K	438 41803	18	15.1	25
C295AC/D2K2	438 42202	2.2	9.1	15	C295AC/D20K	438 42003	20	15.1	25
C295AC/D2K4	438 42402	2.4	10.1	15	C295AC/D22K	438 42203	22	15.1	25
C295AC/D2K7	438 42702	2.7	10.1	15	C295AC/D24K	438 42403	24	15.1	25

Packing quantity: Multiples of 25 to 125 pieces according to dimensions
Available for current production; not intended for new designs

C295 (435, 436, 438)



Capacitance tolerance $\pm 1\%$
Losses (at 1 kHz) $\tan \delta < 2 \times 10^{-4}$
(at 1 MHz) $< 10 \times 10^{-4}$
Insulation resistance at 20°C for C < 100nF $> 10^6 M\Omega$
for C ≥ 100nF $> 10^5 M\Omega$
Temperature range C295AA and AC -40 to +85°C
C295AH -40 to +70°C



For capacitors of body length L = 15mm $l = 33$ mm and d = 0.7mm dia
L = 25mm $l = 43$ mm and d = 0.8mm dia

Film/foil capacitors

miniature, polystyrene (extended foil) book 3 part 1

424 Series 63V d.c. working							
Type No.		Capacitance pF	D mm	Type No.		Capacitance pF	D mm
±1%	±5%			±1%	±5%		
424 44302	424 24302	4300	4.5	424 45602	424 25602	5600	5
424 44702	424 24702	4700	4.5	424 46202	424 26202	6200	5
424 45102	424 25102	5100	5	424 46802	424 26802	6800	5.5

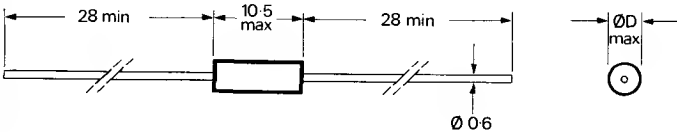
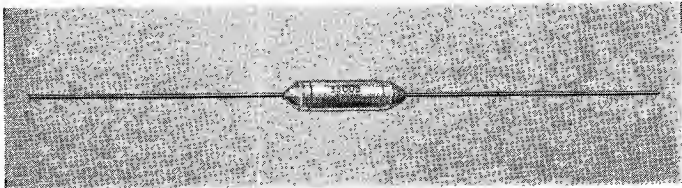
425 Series 125V d.c. working							
Type No.		Capacitance pF	D mm	Type No.		Capacitance pF	D mm
±1%	±5%			±1%	±5%		
425 45601	425 25601	560	3.5	425 41602	425 21602	1600	4.5
425 46201	425 26201	620	3.5	425 41802	425 21802	1800	4.5
425 46801	425 26801	680	3.5	425 42002	425 22002	2000	4.5
425 47501	425 27501	750	3.5	425 42202	425 22202	2200	5
425 48201	425 28201	820	3.5	425 42402	425 22402	2400	5
425 49101	425 29101	910	3.5	425 42702	425 22702	2700	5
425 41002	425 21002	1000	3.5	425 43002	425 23002	3000	5.5
425 41102	425 21102	1100	4	425 43302	425 23302	3300	5.5
425 41202	425 21202	1200	4	425 43602	425 23602	3600	6
425 41302	425 21302	1300	4	425 43902	425 23902	3900	6
425 41502	425 21502	1500	4				

427 Series 500V d.c. working							
Type No.		Capacitance pF	D mm	Type No.		Capacitance pF	D mm
±1%	±5%			±1%	±5%		
427 41001	427 21001	100	3.5	427 42401	427 22401	240	3.5
427 41101	427 21101	110	3.5	427 42701	427 22701	270	3.5
427 41201	427 21201	120	3.5	427 43001	427 23001	300	3.5
427 41301	427 21301	130	3.5	427 43301	427 23301	330	4
427 41501	427 21501	150	3.5	427 43601	427 23601	360	4
427 41601	427 21601	160	3.5	427 43901	427 23901	390	4.5
427 41801	427 21801	180	3.5	427 44301	427 24301	430	4.5
427 42001	427 22001	200	3.5	427 44701	427 24701	470	4.5
427 42201	427 22201	220	3.5	427 45101	427 25101	510	5

Packing quantity: Multiples of 500 pieces.

Capacitance tolerance	±1% or ±5%
Losses (at 1 kHz)	$\tan \delta < 2 \times 10^{-4}$
(at 1 MHz)	$< 5 \times 10^{-4}$
Insulation resistance at 20°C	$> 10^5 \text{ M}\Omega$
Temperature range 63V	-40 to +70°C
125V	-40 to +85°C
500V	-40 to +85°C

424/425/427





Film/foil capacitors

*p.e.t.p. (extended foil) book 3 part 1

C296AA (311) Series 160V d.c. working

Type No.	Code No.	Capacitance μF	Dimensions mm	
			D	L
C296AA/A10K	311 31103	0.01	7.5	21
C296AA/A15K	311 31153	0.015	7.5	21
C296AA/A22K	311 31223	0.022	7.5	21
C296AA/A33K	311 31333	0.033	7.5	21
C296AA/A47K	311 31473	0.047	8	21
C296AA/A68K	311 31683	0.068	9	21
C296AA/A100K	311 31104	0.1	10.5	21

Type No.	Code No.	Capacitance μF	Dimensions mm	
			D	L
C296AA/A150K	311 31154	0.15	12	21
C296AA/A220K	311 31224	0.22	10	35
C296AA/A330K	311 31334	0.33	12	35
C296AA/A470K	311 31474	0.47	14	35
C296AA/A680K	311 31684	0.68	16	35
C296AA/A1M	311 31105	1	18.5	35

C296AC (311) Series 400V d.c. working

C296AC/A1K	311 51102	0.001	7.5	21
C296AC/A1K5	311 51152	0.0015	7.5	21
C296AC/A2K2	311 51222	0.0022	7.5	21
C296AC/A3K3	311 51332	0.0033	7.5	21
C296AC/A4K7	311 51472	0.0047	7.5	21
C296AC/A6K8	311 51682	0.0068	7.5	21
C296AC/A10K	311 51103	0.01	7.5	21
C296AC/A15K	311 51153	0.015	7.5	21
C296AC/A22K	311 51223	0.022	8.5	21

C296AC/A33K	311 51333	0.033	10	21
C296AC/A47K	311 51473	0.047	11.5	21
C296AC/A68K	311 51683	0.068	9.5	35
C296AC/A100K	311 51104	0.1	11	35
C296AC/A150K	311 51154	0.15	12.5	35
C296AC/A220K	311 51224	0.22	14.5	35
C296AC/A330K	311 51334	0.33	17	35
C296AC/A470K	311 51474	0.47	19.5	35

*Polyethylene terephthalate

Packing quantity: Multiples of 1000 pieces

Capacitance tolerance

Losses (at 1kHz)

Insulation resistance at 20°C

Temperature range

$\pm 10\%$

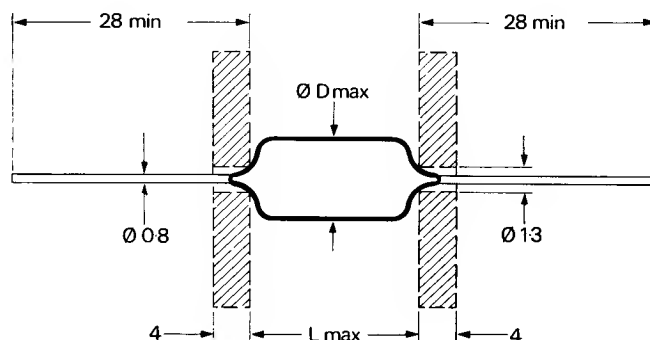
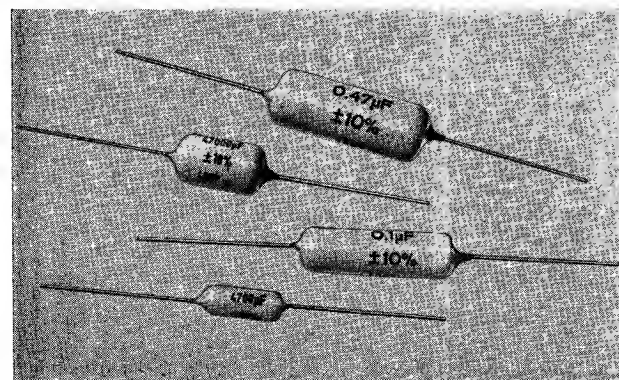
$\tan \delta < 60 \times 10^{-4}$

for $C < 0.22 \mu\text{F}$ $R > 50\,000\,\text{M}\Omega$

for $C > 0.33 \mu\text{F}$ $RC > 16\,500\,\text{M}\Omega \mu\text{F}$

-40 to $+85^\circ\text{C}$

C296 (311)



Film/foil capacitors

*p.e.t.p. (extended foil) (cont.) book 3 part 1

347 2 Series 100V d.c. working

Type No.	Capacitance nF	Dimensions mm				
		S	L	T	H	d
347 21104	100	15.2	19	7.5	16.5	0.8
347 21154	150	15.2	19	8.5	17.5	0.8

347 4 Series 250V d.c. working

347 41103	10	10.2	13.5	5	13	0.6
347 41153	15	10.2	13.5	6	14	0.6
347 41223	22	10.2	13.5	6.5	14	0.6
347 41333	33	15.2	19	6	15	0.8
347 41473	47	15.2	19	7	16	0.8
347 41683	68	15.2	19	8	17	0.8
347 41104	100	22.9	27	7	19	0.8
347 41154	150	22.9	27	8.5	19.5	0.8
347 41224	220	22.9	27	10	22	0.8
347 41334	330	27.9	32	10.5	22.5	0.8
347 41474	470	27.9	32	12.5	24.5	0.8
347 41684	680	27.9	32	15.5	27.5	0.8

347 5 Series 400V d.c. working

347 51472	4.7	10.2	13.5	4.5	12.5	0.6
347 51682	6.8	10.2	13.5	5.5	13.5	0.6

347 6 Series 630V d.c. working

347 61222	2.2	10.2	13.5	4.5	12.5	0.6
347 61332	3.3	10.2	13.5	5.5	13.5	0.6

*Polyethylene terephthalate

Packing quantity: Multiples of 2000 pieces

Capacitance tolerance

Losses (at 10kHz)

(at 1kHz)

Insulation resistance at 20°C

Temperature range

±10%

$\tan \delta$ for $C \leq 100\text{nF}$ $< 120 \times 10^{-4}$

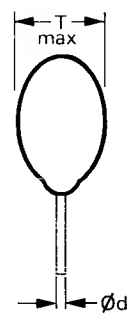
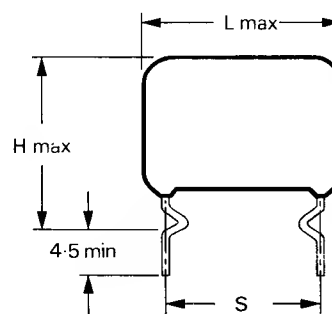
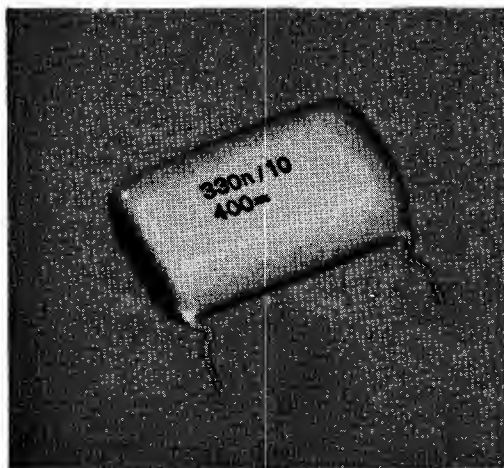
for $C > 100\text{nF}$ $< 60 \times 10^{-4}$

for $C \leq 100\text{nF}$ $R > 10^5\text{M}\Omega$

for $C > 100\text{nF}$ $RC > 10\,000\text{s}$

-40 to +85°C

347





Film/foil capacitors polypropylene and paper (extended foil) book 3 part 1

278 Series 2 kV peak to peak

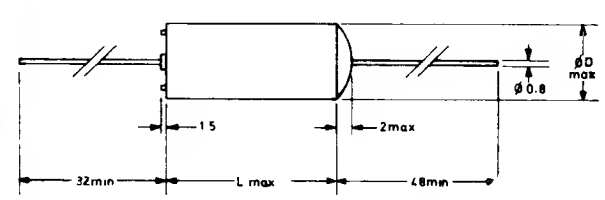
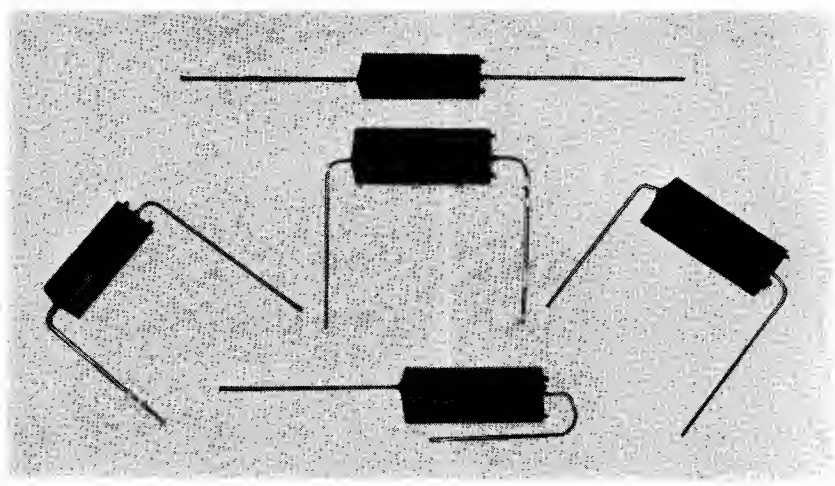
Type No.	Capacitance nF	Dimensions mm	
		D	L
278 82152	1.5	13.5	36
278 82182	1.8	13.5	36
278 82202	2	13.5	36

Type No.	Capacitance nF	Dimensions mm	
		D	L
278 82522	5.2	16.5	41
278 82822	8.2	16.5	41
278 82103	10	16.5	41
278 82113	11	16.5	41

Packing quantity : Multiples of 600 pieces

Capacitance tolerance $\pm 5\%$
Losses (at 1kHz) $\tan \delta < 30 \times 10^{-4}$
(at 10kHz) $< 60 \times 10^{-4}$
(at 100kHz) $< 150 \times 10^{-4}$
Insulation resistance at 20°C $> 50\,000\text{M}\Omega$
Temperature range -25 to $+85^\circ\text{C}$

278





Ceramic capacitors miniature, plate (low-K) book 3 part 1

C333 (632) Series 63V d.c. working

Type No.	Code No.	Capacitance pF	Capacitance code marking	Size
C333CB/N1E8	632 09188	1·8	1p8	1
C333CB/N2E2	632 09228	2·2	2p2	1
C333CB/N2E7	632 09278	2·7	2p7	1
C333CB/N3E3	632 09338	3·3	3p3	1
C333CB/N3E9	632 09398	3·9	3p9	1
C333CB/N4E7	632 09478	4·7	4p7	1
C333CB/N5E6	632 09568	5·6	5p6	1
C333CB/N6E8	632 09688	6·8	6p8	1
C333CB/N8E2	632 09828	8·2	8p2	1
C333CB/C10E	632 10109	10	10p	1
C333CB/C12E	632 10129	12	12p	1
C333CB/C15E	632 10159	15	15p	1
C333CB/C18E	632 10189	18	18p	1
C333CC/C22E	632 34229	22	22p	1

Type No.	Code No.	Capacitance pF	Capacitance code marking	Size
C333CC/C27E	632 34279	27	27p	2
C333CC/C33E	632 34339	33	33p	2
C333CC/C39E	632 34399	39	39 or 39p	2
C333CC/C47E	632 34479	47	47 or 47p	2
C333CC/C56E	632 34569	56	56 or 56p	3
C333CC/C68E	632 34689	68	68 or 68p	3
C333CC/C82E	632 34829	82	82 or 82p	4
C333CC/C100E	632 34101	100	100 or n10	4
C333CC/C120E	632 34121	120	120 or n12	5
C333CC/C150E	632 34151	150	150 or n15	5
C333CH/C180E	632 58181	180	180 or n18	4
C333CH/C220E	632 58221	220	220 or n22	4
C333CH/C270E	632 58271	270	270 or n27	5
C333CH/C330E	632 58331	330	330 or n33	5

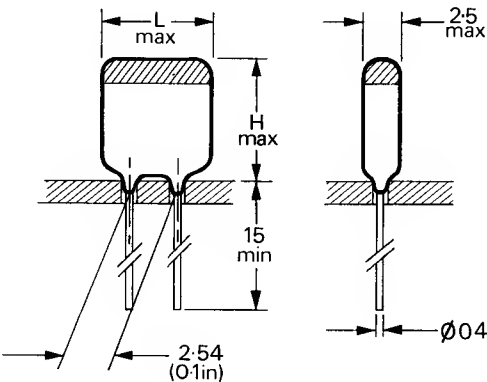
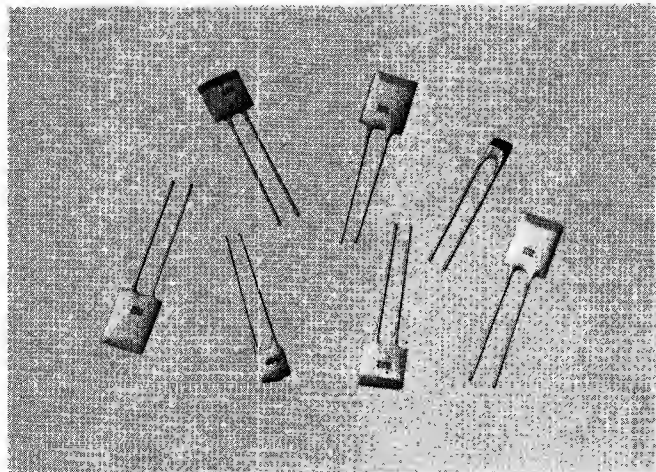
Packing quantity : Multiples of 1000 pieces

Capacitance tolerance	1·8 to 8·2 pF $\pm 0\cdot25$ pF 10 to 330 pF $\pm 2\%$
Insulation resistance at 20°C	>1000 M Ω
Temperature range	-55 to +85°C
Temperature coefficient	1·8 to 18 pF = NP0 22 to 150 pF = N150 180 to 330 pF = N750

Dimensions mm

Size	L	H
1	3·5	4·5
2	4·5	5·5
3	5·5	6·5
4	6·5	7·5
5	6·5	10·5

C333 (632)





Electrolytic capacitors

long life, small book 3 part 1

C428 (101) Series

Type No.	Code No.	Working voltage Vdc	Capacitance μ F	Can size
C428AR/B25	101 12259	4	25	1
C428AR/B50	101 12509	4	50	1
C428AR/B80	101 12809	4	80	2
C428AR/B160	101 12161	4	160	3
C428AR/B320	101 12321	4	320	4
C428AR/C20	101 13209	6.4	20	1
C428AR/C40	101 13409	6.4	40	1
C428AR/C64	101 13649	6.4	64	2
C428AR/C125	101 13131	6.4	125	3
C428AR/C250	101 13251	6.4	250	4
C428AR/D16	101 14169	10	16	1
C428AR/D32	101 14329	10	32	1
C428AR/D50	101 14509	10	50	2
C428AR/D100	101 14101	10	100	3
C428AR/D200	101 14201	10	200	4
C428AR/E10	101 15109	16	10	1
C428AR/E20	101 15209	16	20	1
C428AR/E32	101 15329	16	32	2

Type No.	Code No.	Working voltage Vdc	Capacitance μ F	Can size
C428AR/E64	101 15649	16	64	3
C428AR/E125	101 15131	16	125	4
C428AR/F6.4	101 16648	25	6.4	1
C428AR/F12.5	101 16139	25	12.5	1
C428AR/F20	101 16209	25	20	2
C428AR/F40	101 16409	25	40	3
C428AR/F80	101 16809	25	80	4
C428AR/G4	101 17408	40	4	1
C428AR/G8	101 17808	40	8	1
C428AR/G12.5	101 17139	40	12.5	2
C428AR/G25	101 17259	40	25	3
C428AR/G50	101 17509	40	50	4
C428AR/H2.5	101 18258	64	2.5	1
C428AR/H5	101 18508	64	5	1
C428AR/H8	101 18808	64	8	2
C428AR/H16	101 18169	64	16	3
C428AR/H32	101 18329	64	32	4

Post Office approval to D2186 and RRE recommended

Packing quantity: Multiples of 200 pieces.

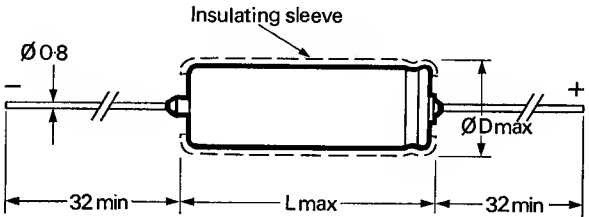
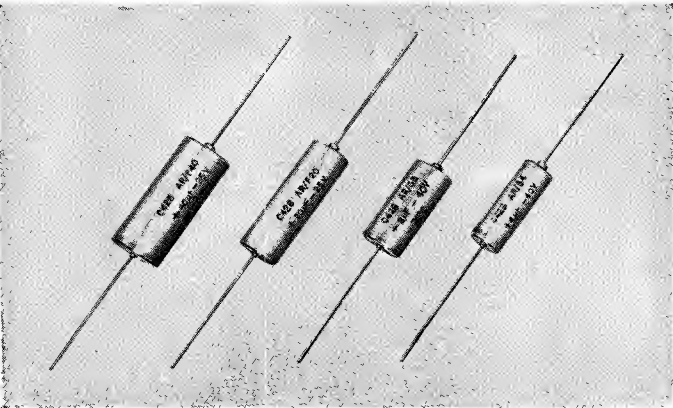
Available for current production; not intended for new designs

Capacitance tolerance -10 to $+50\%$
Temperature range -40 to $+70^{\circ}\text{C}$

Dimensions mm

Can size	L	D
1	22.5	8.5
2	22.5	10.5
3	30.5	10.5
4	30.5	13

C428 (101)





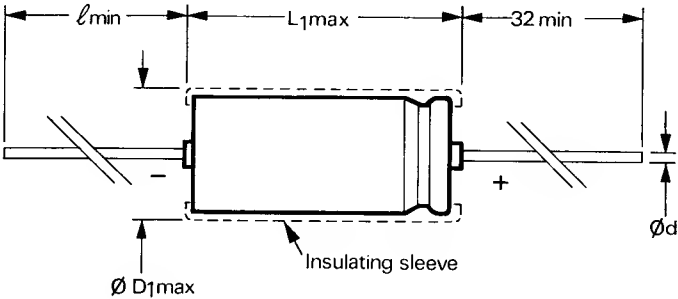
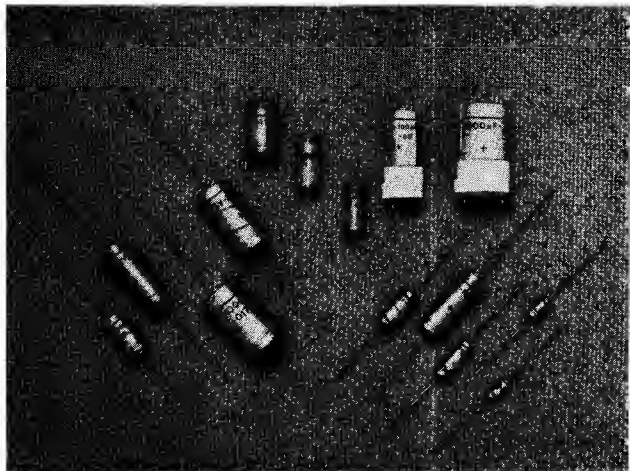
Electrolytic capacitors

general purpose, miniature and small book 3 part 1

015, 016, 017 Series – axial version							
Type No.	Working voltage Vdc	Capacitance μF	Can size	Type No.	Working voltage Vdc	Capacitance μF	Can size
015 12479	4	47	2	015 16109	25	10	2
015 12101	4	100	3	015 16229	25	22	3
016 12221	4	220	4	016 16479	25	47	4
016 12331	4	330	5	016 16101	25	100	5
017 12102	4	1000	00	016 16151	25	150	6
017 12472	4	4700	03	017 16221	25	220	00
015 13339	6.3	33	2	017 16471	25	470	01
015 13689	6.3	68	3	017 16681	25	680	02
016 13151	6.3	150	4	017 16102	25	1000	03
016 13471	6.3	470	6	015 17688	40	6.8	2
017 13681	6.3	680	00	015 17159	40	15	3
017 13152	6.3	1500	01	016 17339	40	33	4
017 13222	6.3	2200	02	016 17479	40	47	5
017 13332	6.3	3300	03	016 17101	40	100	6
015 14229	10	22	2	017 17151	40	150	00
015 14479	10	47	3	017 17221	40	220	01
016 14101	10	100	4	017 17471	40	470	02
016 14221	10	220	5	017 17681	40	680	03
016 14331	10	330	6	015 18108	63	1	3
017 14471	10	470	00	015 90001	63	1.5	3
017 14102	10	1000	01	015 18228	63	2.2	3
017 14152	10	1500	02	015 18338	63	3.3	3
017 14222	10	2200	03	015 90003	63	4.7	3
015 15159	16	15	2	015 18688	63	6.8	3
015 15339	16	33	3	016 18109	63	10	4
016 15689	16	68	4	016 18159	63	15	4
016 15151	16	150	5	016 18229	63	22	5
016 15221	16	220	6	016 18479	63	47	6
017 15331	16	330	00	017 18689	63	68	00
017 15681	16	680	01	017 18101	63	100	01
017 15102	16	1000	02	017 18151	63	150	01
017 15152	16	1500	03	017 18221	63	220	02
				017 18331	63	330	03

For can sizes see next page

015, 016, 017



Electrolytic capacitors

general purpose, miniature and small (cont.) book 3 part 1

015, 016, 017 Series – printed wiring versions

Type No.	Working voltage Vdc	Capacitance μ F	Can size	Fig.
016 42221	4	220	4	1
016 42331	4	330	5	1
017 52102	4	1000	00	2
017 52472	4	4700	03	2
016 43151	6.3	150	4	1
016 43471	6.3	470	6	1
017 53681	6.3	680	00	2
017 53152	6.3	1500	01	2
017 53222	6.3	2200	02	2
017 53332	6.3	3300	03	2
016 44101	10	100	4	1
016 44221	10	220	5	1
016 44331	10	330	6	1
017 54471	10	470	00	2
017 54102	10	1000	01	2
017 54152	10	1500	02	2
017 54222	10	2200	03	2
016 45689	16	68	4	1
016 45151	16	150	5	1
016 45221	16	220	6	1
017 55331	16	330	00	2
017 55681	16	680	01	2
017 55102	16	1000	02	2
017 55152	16	1500	03	2

Type No.	Working voltage Vdc	Capacitance μ F	Can size	Fig.
016 46479	25	47	4	1
016 46101	25	100	5	1
016 46151	25	150	6	1
017 56221	25	220	00	2
017 56471	25	470	01	2
017 56681	25	680	02	2
017 56102	25	1000	03	2
016 47339	40	33	4	1
016 47479	40	47	5	1
016 47101	40	100	6	1
017 57151	40	150	00	2
017 57221	40	220	01	2
017 57471	40	470	02	2
017 57681	40	680	03	2
016 48109	63	10	4	1
016 48159	63	15	4	1
016 48229	63	22	5	1
016 48479	63	47	6	1
017 58689	63	68	00	2
017 58101	63	100	01	2
017 58151	63	150	01	2
017 58221	63	220	02	2
017 58331	63	330	03	2

Packing quantity: Multiples of 1000 pieces

Capacitance tolerance

–10 to +50%

Temperature range

015 Series

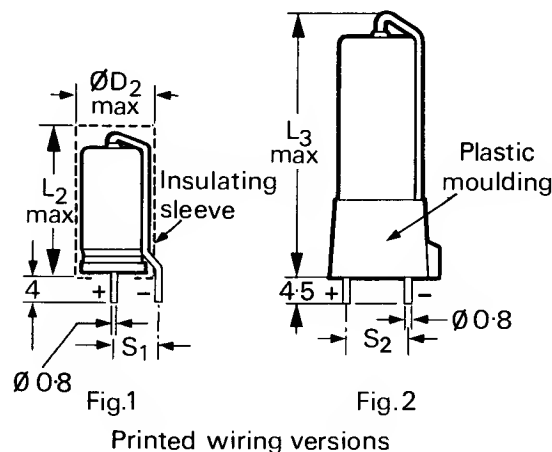
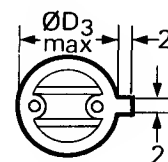
–25 to +85°C

016, 017 Series

–40 to +85°C

Dimensions mm

Axial lead version					Printed wiring versions					
Can size	L_1	D_1	ϕ	d	Fig. 1			Fig. 2		
					L_2	D_2	S_1	L_3	D_3	S_2
2	12.5	4.8	32	0.6	–	–	–	–	–	–
3	12.5	6.1	32	0.6	–	–	–	–	–	–
4	18.5	6.7	32	0.8	23	8.5	5.1	–	–	–
5	18.5	8.3	32	0.8	23	10.2	5.1	–	–	–
6	18.5	10.3	32	0.8	23	12.1	7.6	–	–	–
00	30.5	10.4	54	0.8	–	–	–	39.5	12.8	10.2
01	30.5	12.9	54	0.8	–	–	–	39.5	15.2	10.2
02	30.5	15.4	54	0.8	–	–	–	39.5	17.8	12.7
03	30.5	18.4	54	0.8	–	–	–	39.5	20.8	15.2



Electrolytic capacitors

general purpose, large book 3 part 1

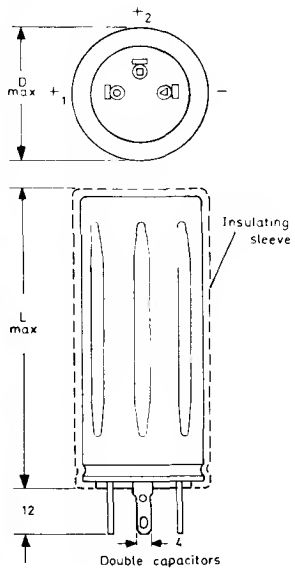
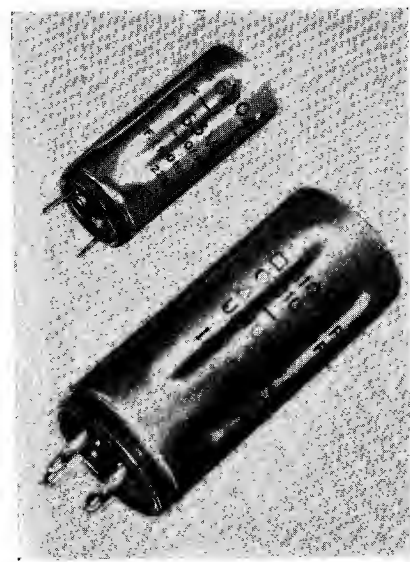
071, 072 Series (to I.E.C. 103 Type 1)						
Type No.	Working voltage Vdc	Capacitance μF	Can size	I_r max. at 100Hz (A)		
				at 50°C	at 70°C	at 85°C
071 14472	10	4700	5	2.5	1.9	1.1
071 14682	10	6800	6	4.0	3.1	1.8
071 14103	10	10 000	7	6.0	4.6	2.7
071 14153	10	15 000	8	8.2	6.3	3.7
072 14113	10	11 000+11 000	9	10.6	8.3	4.8
072 14173	10	16 500+16 500	10	13.4	10.4	6.0
071 15332	16	3300	5	2.4	1.9	1.1
071 15472	16	4700	6	3.9	3.0	1.7
071 15682	16	6800	7	5.8	4.5	2.6
071 15103	16	10 000	8	7.9	6.1	3.5
072 15752	16	7500+7500	9	10.5	7.6	4.7
072 15113	16	11 000+11 000	10	13.8	10.6	6.1
071 16222	25	2200	5	2.2	1.7	1.0
071 16332	25	3300	6	3.7	2.8	1.7
071 16472	25	4700	7	5.4	4.2	2.4
071 16682	25	6800	8	7.3	5.6	3.3
072 16502	25	5000+5000	9	9.6	7.4	4.3
072 16752	25	7500+7500	10	12.6	9.8	5.7
071 17102	40	1000	5	2.1	1.6	1.0
071 17222	40	2200	6	2.9	2.2	1.3
071 17332	40	3300	7	5.2	4.1	2.4
071 17472	40	4700	8	7.0	5.4	3.1
072 17342	40	3400+3400	9	9.1	7.1	4.1
072 17502	40	5000+5000	10	12.0	8.7	5.3
071 18681	63	680	5	2.1	1.4	0.8
071 18102	63	1000	6	2.9	2.2	1.3
071 18152	63	1500	7	4.3	3.4	2.0
071 18222	63	2200	8	5.8	4.5	2.6
072 18172	63	1650+1650	9	7.8	6.0	3.5
072 18242	63	2350+2350	10	10.0	7.8	4.5

Approved to Post Office D2186
Also available in lower voltage ranges.
Packing quantity: Multiples of 100 pieces.

Tag width: 4mm

Capacitance tolerance -10 to +50%
Temperature range -40 to +85°C

071, 072



Dimensions mm

Can size	L	D	Clips
5	50.3	21.6	B127121
6	50.3	25.6	B127122
7	81.3	25.6	B127122
8	81.3	30.6	DT2402
9	81.3	35.6	B127124
10	81.3	40.8	B127125



Electrolytic capacitors

long life, large (computer) book 3 part 1

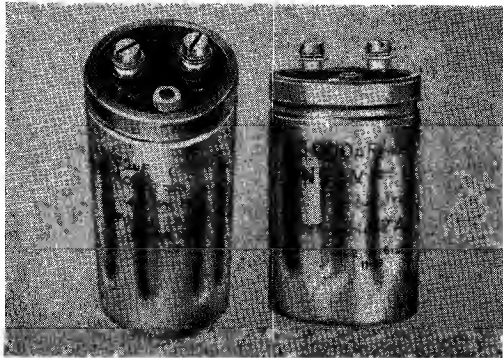
106, 107 Series (to I.E.C. 103 Type 1)						
Type No.	Working voltage Vdc	Capacitance μ F	Can size	I_r max. at 100 Hz, (A)		
				at 50°C	at 70°C	at 85°C
106 15103	16	10 000	11	7	6.3	3.1
106 15153	16	15 000	12	10	9	4.5
106 15223	16	22 000	14	12	11	5.4
106 15333	16	33 000	15	17	15	7.7
106 15663	16	68 000	16	28	25	12.6
106 16662	25	6800	11	7	6.3	3.1
106 16103	25	10 000	12	10	9	4.5
106 16153	25	15 000	14	12	11	5.4
106 16223	25	22 000	15	17	15	7.7
106 16473	25	47 000	16	28	25	12.6
106 17472	40	4700	11	7	6.3	3.1
106 17662	40	6800	12	10	9	4.5
106 17103	40	10 000	14	12	11	5.4
106 17153	40	15 000	15	17	15	7.7
106 17333	40	33 000	16	28	25	12.6
106 18222	63	2200	11	7	6.3	3.1
106 18332	63	3300	12	10	9	4.5
106 18472	63	4700	14	12	11	5.4
106 16682	63	6800	15	17	15	7.7
106 16153	63	15 000	16	28	25	12.6
107 10152	100	1500	11	7	6.3	3.1
107 10222	100	2200	12	10	9	4.5
107 10332	100	3300	14	12	11	5.4
107 10472	100	4700	15	17	15	7.7
107 10103	100	10 000	16	28	25	12.6

Approved to Post Office D2166, Min. of Defence (Naval) DEF5134—1 and Min. of Defence (SRDE) 070/6/01

Packing quantity: Multiples of 50 pieces

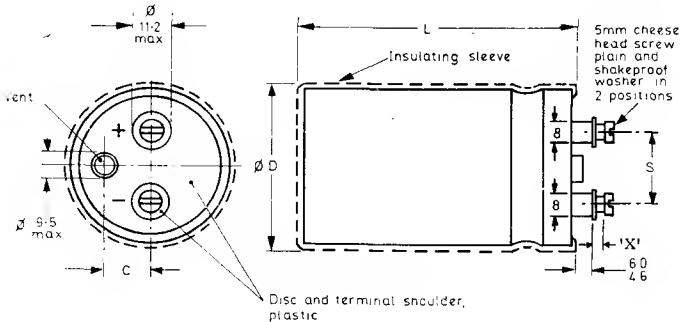
Capacitance tolerance – 10 to +50%
Temperature range
 106 Series – 40 to +85°C
 107 Series – 25 to +85°C

106, 107



Dimensions mm

Can size	L	D	S	C	Clips
11	83	36.8	15	8.4	DT2401
12	115	36.8	15	8.4	DT2401
14	83	51.8	22	14.3	DT2254
15	115	51.8	22	14.3	DT2254
16	115	66.8	31	19.0	DT2400



Electrolytic capacitors

long life, small book 3 part 1

108 Series (to I.E.C. 103 Type 1)				
Type No.	Working voltage Vdc	Capacitance μF	Can size	I _r max. at 100Hz, (mA) at 85°C
108 13151	6.3	150	5	130
108 13331	6.3	330	6	220
108 13471	6.3	470	00	325
108 13102	6.3	1000	01	470
108 13152	6.3	1500	02	630
108 13222	6.3	2200	03	920
108 14101	10	100	5	120
108 14221	10	220	6	205
108 14331	10	330	00	325
108 14681	10	680	01	470
108 14102	10	1000	02	630
108 14152	10	1500	03	920
108 15689	16	68	5	110
108 15151	16	150	6	190
108 15221	16	220	00	270
108 15471	16	470	01	360
108 15681	16	680	02	500
108 15102	16	1000	03	650
108 16339	25	33	5	85
108 16479	25	47	5	100
108 16101	25	100	6	170
108 16151	25	150	00	270
108 16221	25	220	01	360
108 16471	25	470	02	500
108 16681	25	680	03	650
108 17229	40	22	5	80
108 17479	40	47	6	130
108 17689	40	68	00	195
108 17151	40	150	01	280
108 17221	40	220	02	360
108 17331	40	330	03	495
108 18228	63	2.2	5	25
108 18338	63	3.3	5	30
108 18478	63	4.7	5	35
108 18688	63	6.8	5	45
108 18109	63	10	5	50
108 18159	63	15	6	75
108 18339	63	33	00	125
108 18689	63	68	01	195
108 18101	63	100	02	275
108 18151	63	150	03	355

Approved to Post Office D2186 and Min. of Defence (Naval) DEF5134-1

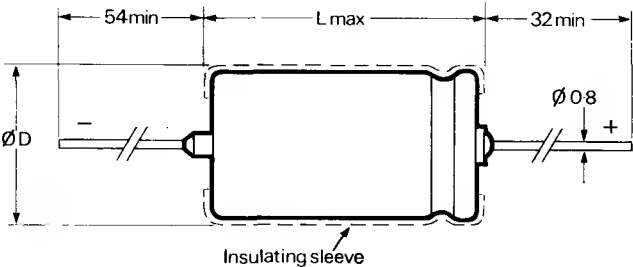
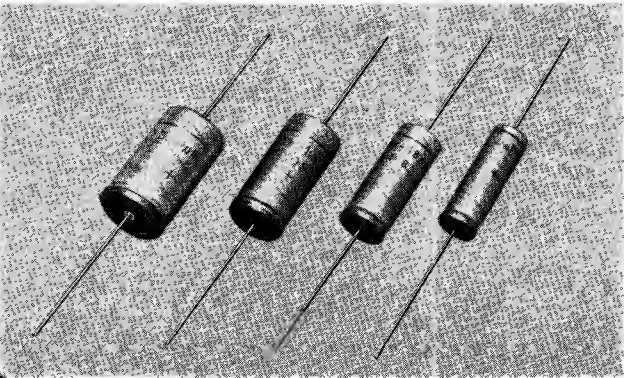
Packing quantity : Multiples of 250 pieces for cans 00 to 03
100 pieces for cans 5 and 6

Capacitance tolerance -10 +50%
Temperature range -40 to +85°C

Dimensions mm

Can size	L	D
5	22.5	8.5
6	22.5	10.5
00	32.5	10.5
01	32.5	12.5
02	32.5	15.5
03	32.5	18.5

108





Electrolytic capacitors

solid electrolyte, aluminium book 3 part 1

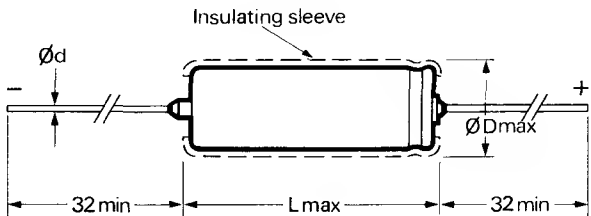
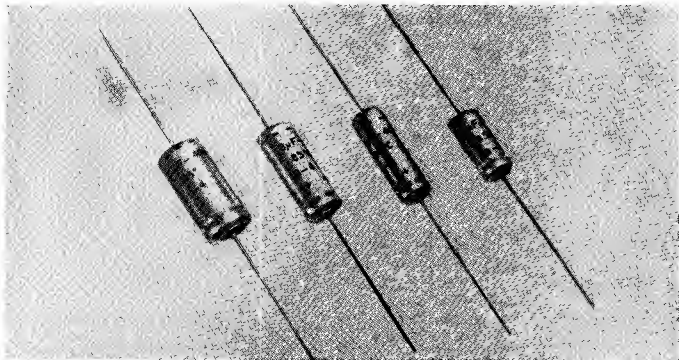
121 Series							
Type No.	Working voltage Vdc	Capacitance μ F	Can size	Type No.	Working voltage Vdc	Capacitance μ F	Can size
121 13229	6.3	22	1	121 15479	16	47	4
121 13479	6.3	47	2	121 15689	16	68	5
121 13689	6.3	68	3	121 15101	16	100	6
121 13151	6.3	150	4	121 16478	25	4.7	1
121 13221	6.3	220	5	121 16109	25	10	2
121 13331	6.3	330	6	121 16229	25	22	3
121 14159	10	15	1	121 16339	25	33	4
121 14339	10	33	2	121 16479	25	47	5
121 14479	10	47	3	121 16689	25	68	6
121 14101	10	100	4	121 17228	40	2.2	1
121 14151	10	150	5	121 17478	40	4.7	2
121 14221	10	220	6	121 17109	40	10	3
121 15109	16	10	1	121 17229	40	22	4
121 15159	16	15	2	121 17339	40	33	5
121 15339	16	33	3	121 17479	40	47	6

Post Office approved
Packing quantity : Multiples of 100 pieces

Capacitance tolerance $\pm 20\%$
Temperature range -55 to $+85^{\circ}\text{C}$
(up to $+125^{\circ}\text{C}$ with voltage derating)

Dimensions mm							
Can size	L	D	d	Can size	L	D	d
1	17.5	6.6	0.8	4	24	10.4	0.8
2	24	6.6	0.8	5	32	10.4	0.8
3	24	8.3	0.8	6	32	12.9	0.8

121





Variable capacitors

tubular ceramic trimmers book 3 part 1

C004 (802) Series						
Type No.	Code No.	Capacitance swing pF	Minimum capacitance pF	Temperature coefficient ppm per deg C	Dimensions mm	
					Length*	Diameter
C004EA/3E	802 20001	3	<0.8	0 to -400	25.5	6
C004EA/6E	802 20002	6	<0.8	0 to -400	31.5	6
C004EA/12E	802 20004	12	<1	0 to -400	43.5	6
C004EA/18E	802 20005	18	<1.7	0 to -400	43.5	6

*At minimum capacitance

Packing quantity : Multiples of 450 pieces

Working voltage 500V d.c. Temperature range -40 to +85°C

film dielectric trimmers, miniature book 3 part 1

808 Series					
Type No.	Capacitance swing pF	Minimum capacitance pF	Dimensions mm		
			Length	Width	Height above board
808 00004	4.1	1.4	8.8	8	10
808 00005	8	2	8.8	8	10
808 00006	20	2	8.8	8	10
808 01001	59.5	5.5	11.5	10.6	11

Packing quantity : Multiples of 1400 pieces except 808 01001, which is packed in multiple of 800 pieces.

Working voltage 100V d.c. Temperature range -40 to +70°C

809 09 Series					
Type No.	Capacitance swing pF	Minimum capacitance pF	Dimensions mm		
			Length	Width	Height above board
809 09001	4.1	1.4	8.8	8	10
809 09002	7	2	8.8	8	10
809 09003	16	2	8.8	8	10

Packing quantity : Multiples of 900 pieces

Working voltage 300V d.c. Temperature range -40 to +125°C

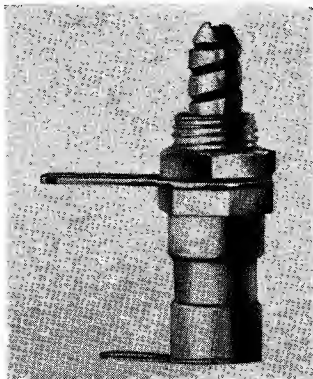
809 08 Series					
Type No.	Capacitance swing pF	Minimum capacitance pF	Dimensions mm		
			Length	Width	Height above board
809 08002	36	4	10.9	10.5	11
809 08003	55	5	10.9	10.5	11

Packing quantity : Multiples of 450 pieces

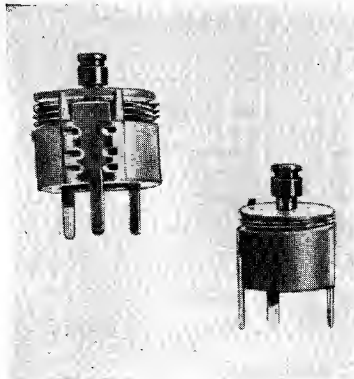
Working voltage 300V d.c. Temperature range -40 to +125°C

809 05 and 809 07 Series are still available for current production but are not recommended for the design of new equipment.

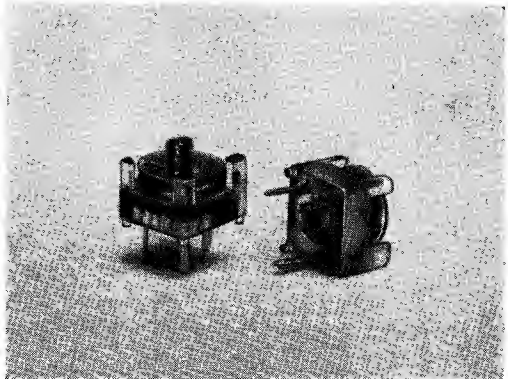
C004EA (802)



808



809 08/809 09

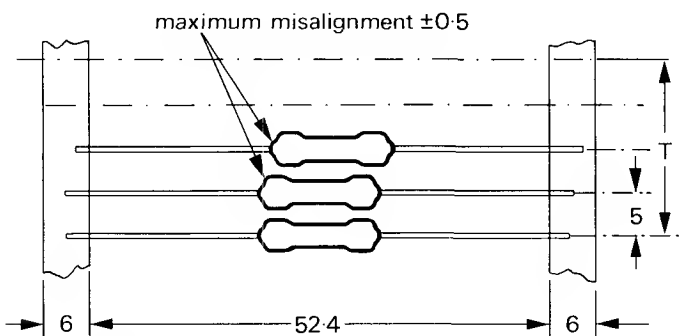




Linear resistors lacquered, carbon film book 3 part 1

Style	Resistance tolerance	Resistance range	Maximum power dissipation at 70°C W	Preferred value series	Maximum voltage d.c. or rms V
CR16	±5%	10 Ω to 220 k Ω	0.2	E12	150
	±10%	270 k Ω to 1 M Ω		E12	150
CR25	±5%	1 Ω to 1 M Ω	0.33	E24	250
	±10%	1.2 M Ω to 10 M Ω		E12	250
CR37	±5%	1 Ω to 1 M Ω	0.5	E24	350
	±10%	1.2 M Ω to 10 M Ω		E12	350

Packed in bandoliers of 1000 pieces with dividing marks at intervals of 100.

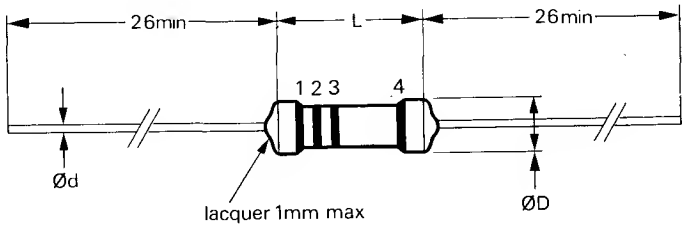
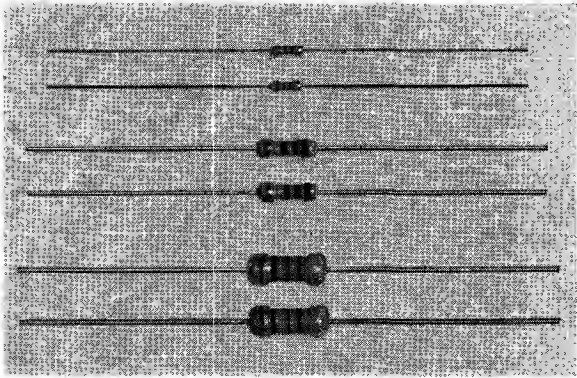


$T = [5(n-1)] \pm 4$

This formula is applicable when the number of resistors (n) is between 50 and 100 pieces.

Dimensions mm			
Style	D max.	L max.	d
CR16	1.6	4.5	0.4
CR25	2.5	7.5	0.6
CR37	3.7	10	0.7

CR16/CR25/CR37



These resistors are coated with a tan coloured lacquer and colour coded in accordance with BS1852.

The four colour bands indicate :— (1) first significant figure (2) second significant figure (3) multiplier and (4) tolerance.

E12 series: 10 12 15 18 22 27 33 39 47 56 68 82

E24 series: 10 11 12 13 15 16 18 20 22 24 27 30 33 36 39 43 47 51 56 62 68 75 82 91

CR16/25/37 resistors are available in the above values and decimal multiples and submultiples thereof.

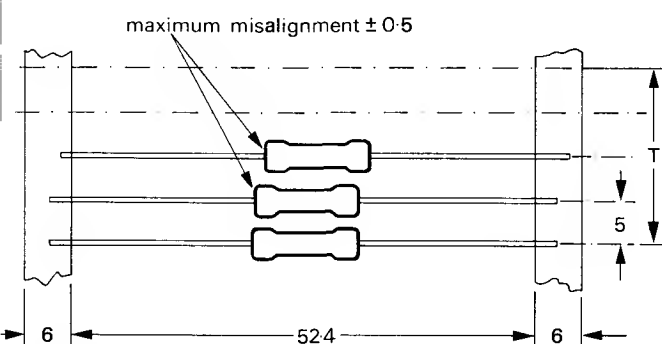


Linear resistors

lacquered, metal film book 3 part 1

Style	Resistance tolerance	Resistance range	Maximum power dissipation at 70°C W	Preferred value series	Temperature coefficient ppm per deg C	Maximum voltage d.c. or rms V
MR25	±1%	4.99 Ω to 301k Ω	0.4	E96	<100 (Typical 60)	250
	±2%	5.1 Ω to 300k Ω		E24		
MR30	±1%	4.99 Ω to 1 M Ω	0.5	E96	<100 (Typical 60)	350
	±2%	5.1 Ω to 1 M Ω		E24		

Packed in bandoliers of 1000 pieces with dividing marks at intervals of 100.

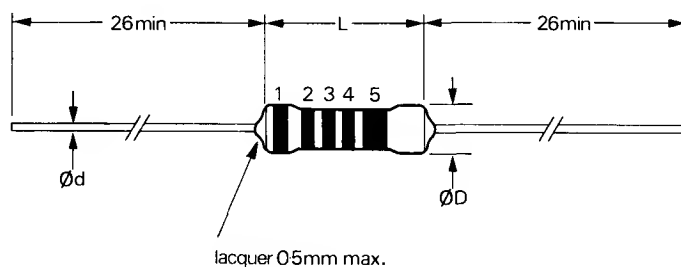
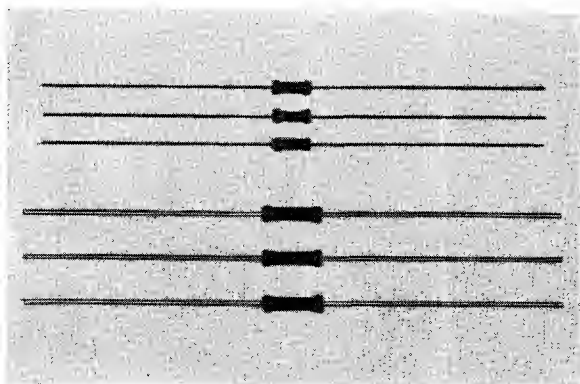


$$T = [5(n-1)] \pm 4$$

This formula is applicable when the number of resistors (n) is between 50 and 100 pieces.

Dimensions mm			
Style	D max.	L max.	d
MR25	2.5	6.5	0.6
MR30	3	10	0.6

MR25/MR30



These resistors are coated with a green coloured lacquer and colour coded in accordance with BS1852.

Resistors in the E24 series with a 2% tolerance, are colour coded with 4 bands: (1) first significant figure, (2) second significant figure, (3) multiplier, (4) tolerance.

Resistors in the E96 series with a 1% tolerance are colour coded with 5 bands: (1) first significant figure, (2) second significant figure, (3) third significant figure, (4) multiplier, (5) tolerance.

E24 series: 10 11 12 13 15 16 18 20 22 24 27 30 33 36 39 43 47 51 56 62 68 75 82 91

E96 series: 100 102 105 107 110 113 115 118 121 124 127 130 133 137 140 143 147 150 154 158 162 165 169 174 178
182 187 191 196 200 205 210 215 221 226 232 237 243 249 255 261 267 274 280 287 294 301 309 316 324
332 340 348 357 365 374 383 392 402 412 422 432 442 453 464 475 487 499 511 523 536 549 562 576 590
604 619 634 649 665 681 698 715 732 750 768 787 806 825 845 866 887 909 931 953 976

MR25/30 resistors are available in the above values and decimal multiples and submultiples thereof.



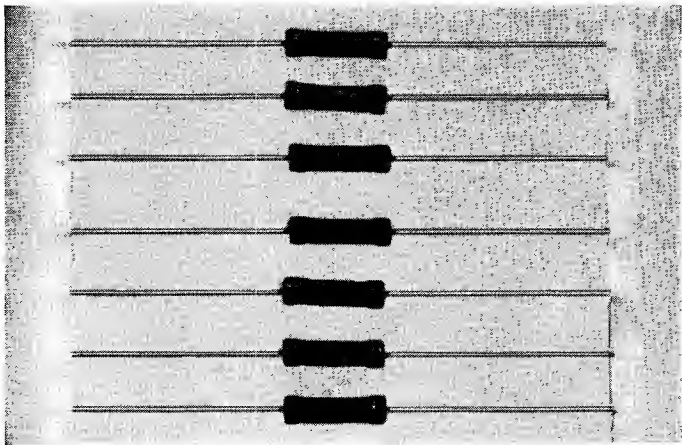
Linear resistors

metal film, high power book 3 part 1

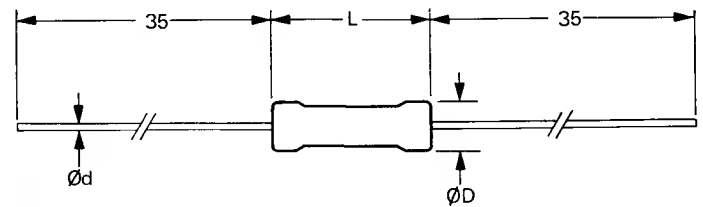
Style	Resistance tolerance	Resistance range	Maximum power dissipation at 70°C W	Preferred value series
PR37	±5%	10 Ω to 10k Ω	1·6	E12
PR52	±5%	10 Ω to 27k Ω	2·5	E12

Packed in bandoliers of 1000 pieces with dividing marks at intervals of 100.

PR52



Dimensions mm			
Style	D max.	L max.	d
PR37	3·7	10	0·6
PR52	5·2	16·7	0·6



These resistors are coated with a red-brown coloured high temperature silicone paint. The resistance value and tolerance are printed on the resistor body.

E12 Series: 10 12 15 18 22 27 33 39 47 56 68 82

PR37/52 resistors are available in the above values and decimal multiples thereof.

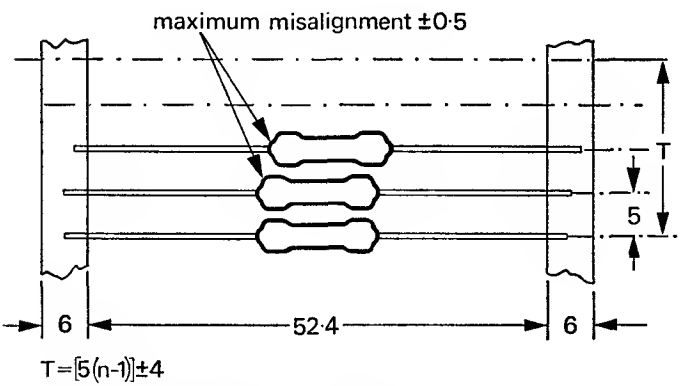


Linear resistors

metal glaze, high ohmic book 3 part 1

Style	Resistance tolerance	Resistance range	Maximum power dissipation at 70°C W	Maximum voltage rms V	Preferred value series
VR37	±5%	1 MΩ to 33 MΩ	0.5	2500	E24

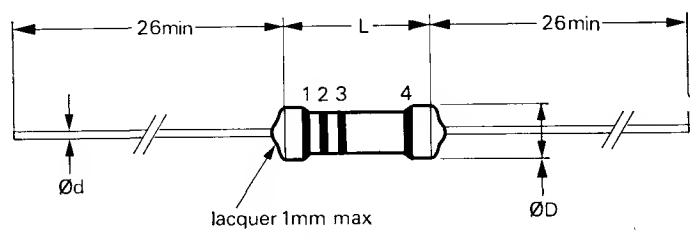
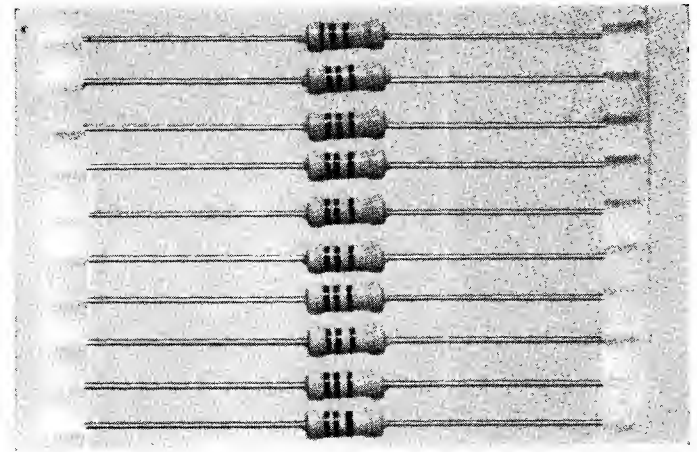
Packed in bandoliers of 1000 pieces with dividing marks at intervals of 100.



This formula is applicable when the number of resistors (n) is between 50 and 100 pieces.

Dimensions mm			
Style	D max.	L max.	d
VR37	3.7	10	0.7

VR37



These resistors are coated with a blue coloured lacquer and colour coded in accordance with BS1852.

The four colour bands indicate :— (1) first significant figure (2) second significant figure (3) multiplier (4) tolerance. In this series the $\pm 5\%$ tolerance is indicated by a yellow band.

E24 series: 10 11 12 13 15 16 18 20 22 24 27 30 33 36 39 43 47 51 56 62 68 75 82 91

VR37 resistors are available in the above values and decimal multiples and submultiples thereof.



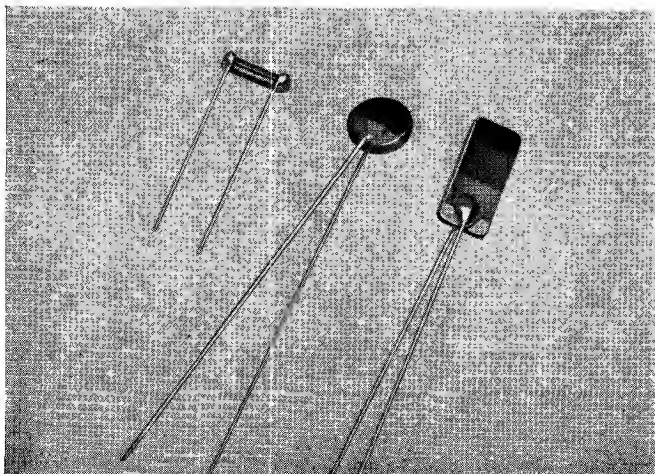
Non-linear resistors negative temperature coefficient book 3 part 1 rod types

Type No.	Code No. 2322 . . .	Resistance at 25°C (R_{25}) Ω	B value K	Maximum dissipation W	Approx. resistance at maximum dissipation Ω	Approx. operating current at maximum dissipation mA	Approx. dissipation factor mW per deg C	Dimensions	
								Diameter mm	Thickness or length mm
VA1066S	635 01472	4.7k	3250	0.6	200	55	5.5	3.7	12
VA1055S	635 01153	15k	3550	0.6	540	33	5.5	3.7	12
VA1056S	635 01473	47k	3925	0.6	1k	23	5.5	3.7	12
VA1067S	635 01154	150k	4075	0.6	3k	15	5.5	3.7	12

disc and plate types

VA1037	619 90002	1.1	2650	1	0.2	2200	14	21 × 9 rectangle	5.2
VA1086	610 11228	2.2	2650	1	0.29	1850	10	9.4	5
VA1033	610 11408	4	2800	1	0.25	2000	10	9.4	5
VA1074	610 11608	6	2800	1	0.45	1500	10	9.4	5
VA1053	610 11808	8	2900	1	0.8	1100	10	9.4	5
VA1110	610 90043	10	2950	1	1	1000	10	9.4	5
VA1100	610 11159	15	3000	1	0.7	1200	10	9.4	5
VA1104	644 90005	15	3350	max. rms current 2.2A			17	16	5
VA1077	619 90003	32	4200	1	0.8	1200	14	21 × 9 rectangle	5.2
VA1034	610 11509	50	3300	1	2.6	600	10	9.4	5
VA1040	610 11131	130	4600	1	2.6	600	10	9.4	5
VA1096	642 11151	150	3275	0.6	19	180	8	5.5	5.5
VA1097	642 11471	470	3425	0.6	52	105	8	5.5	5.5
VA1039	610 11501	500	5200	1	6.8	380	10	9.4	5
VA1038	610 11132	1.3k	5450	1	10.3	300	10	9.4	5
VA1098	642 11152	1.5k	3700	0.6	130	70	8	5.5	5.5
VA1106	642 11222	2.2k	3750	0.6	280	46	8	5.5	5.5
VA1109	642 12472	4.7k	4225	0.6	370	40	8	5.5	5.5
VA1108	642 11153	15k	4250	0.6	920	25	8.5	5.5	5.5
VA1112	642 12223	22k	4300	0.6	1.2k	22	8.5	5.5	5.5
VA1111	642 12333	33k	4325	0.6	1.8k	18	8.5	5.5	5.5

Rod, disc and plate n.t.c. thermistors



Packing quantity : Multiples of 250 pieces except as follows :
VA1037 and VA1077 – 200 pieces
VA1104 – 100 pieces



Non-linear resistors

negative temperature coefficient (cont.) book 3 part 1

miniature bead types

Plain beads		Gas filled glass tube		Glass dipped bead		Thermometer type		Resistance	B
Type No.	Code No. 2322 634 . .	Type No.	Code No. 2322 634 . .	Type No.	Code No. 2322 627 . .	Type No.	Code No. 2322 627 . .	at 25°C (R ₂₅) Ω	value K
VA3100	11102	VA3200	21102	VA3400	21102	VA3700	11102	1000	2375
VA3102	11222	VA3202	21222	VA3402	21222	VA3702	11222	2200	2600
VA3104	11472	VA3204	21472	VA3404	21472	VA3704	11472	4700	3725
VA3106	11103	VA3206	21103	VA3406	21103	VA3706	11103	10 000	3800
VA3108	11223	VA3208	21223	—	—	VA3708	11223	22 000	3875
VA3110	11473	VA3210	21473	VA3410	21473	VA3710	11473	47 000	3850
VA3112	11104	VA3212	21104	VA3412	21104	VA3712	11104	100 000	3975
VA3114	11224	VA3214	21224	VA3414	21224	VA3714	11224	220 000	4200
VA3116	11474	VA3216	21474			VA3716	11474	470 000	4350

Dimensions (millimetres)

Type No. Series	Body		Leads		Type No. Series	Body		Leads	
	Dia. max.	Length max.	Dia.	Length		Dia. max.	Length max.	Dia.	Length
VA3100	1	1	0.06	4.5	VA3400	1.5	5	0.2	21
VA3200	2.5	12	0.24	22	VA3700	2.5	33	0.3	32

Packing quantity : Multiples of 100 pieces.
Maximum dissipation 60mW
Maximum temperature (Tmax) 200°C
Stability ΔR_{25} after 1000 hours at T max. <1%

Dissipation constant approx :
VA3100 Series 0.1 mW/deg C
VA3200 Series 0.4 mW/deg C

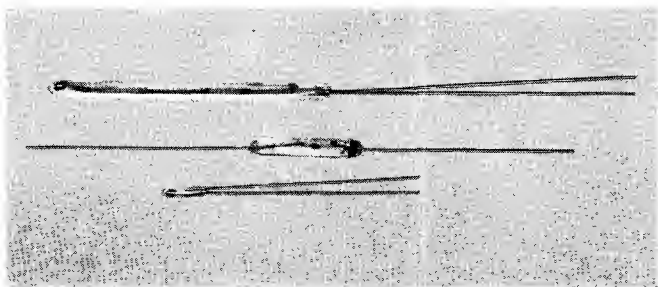
VA3400 Series 0.75 mW/deg C
VA3700 Series 0.7 mW/deg C

plastic encapsulated 'two point' types

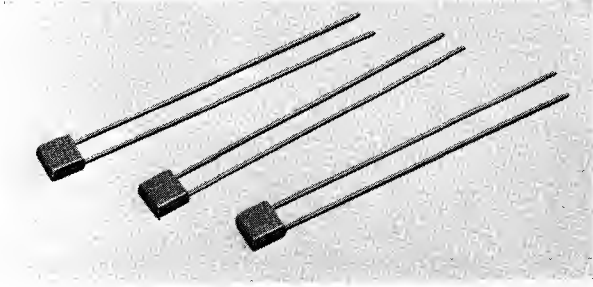
Type No. 2322 . . .	Colour code	Temperature range °C	Resistance at						
			-30°C	-20°C	-10°C	0°C	+25°C	+100°C	+200°C
640 90002	blue	-20 to +25		8.6k Ω ±8%		3.5k Ω	1.215k Ω ±7%		
640 90003	white	-30 to -10	13.35k Ω ±5%	8k Ω ±4%	5k Ω ±4.5%				
640 90004	grey	+25 to +100					12k Ω ±7%	0.95k Ω ±5%	
640 90005	black	+100 to +200						16.7k Ω ±7%	1.12k Ω ±7%

Packing quantity : Multiples of 250 pieces.
Maximum dissipation 0.25W
Voltage proof (terminals to heatsink) 350 Vrms
These plastic encapsulated thermistors are specially designed for temperature measurement and control. The body is 4.2 mm max. square, by 2.7 mm max. thick.

Miniature bead n.t.c. thermistors



Plastic encapsulated n.t.c. thermistors





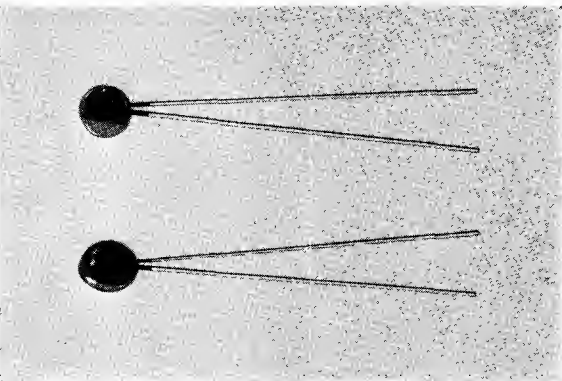
Non-linear resistors

positive temperature coefficient book 3 part 1

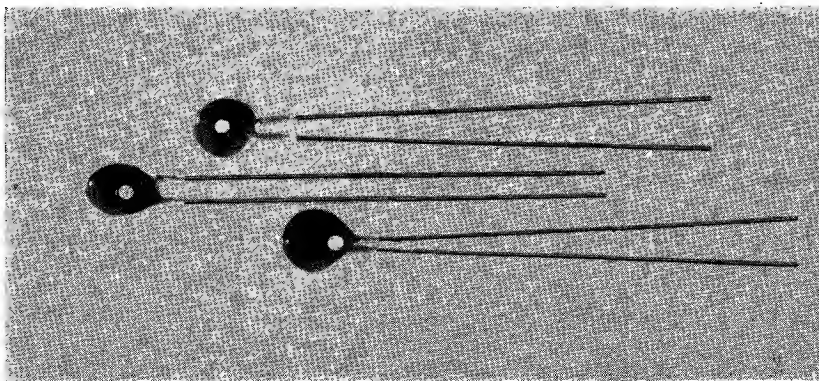
Type No.	Code No. 2322 . . .	Resistance at 25°C (R ₂₅) Ω	Switch temp. °C	App. res. at switch temp. Ω	Temp. coef. at switch temp. % per deg C	Dissipation factor mW per deg C	Max. voltage V	Dimensions mm	
								Body	Leads
E220ZZ/01	661 91005	50	25	50	+ 9	6	40	Ø8.5	Ø0.5 39 long
E220ZZ/02	661 91004	30	45	60	+16	8.5	50		
E220ZZ/03	661 91002	50	80	150	+18	8.5	50		
E220ZZ/04	661 91003	40	110	80	+25	8.5	50		
VA8650	662 93037	80	75	220	+23	21	265	Ø12.6	Ø0.8, 30 long

Packing quantity : Multiples of 250 pieces except VA8650 which is packed in multiples of 100 pieces.
Note : Type VA8650 with VDR type E299DH/P230 is specially designed for degaussing colour tv picture tubes.

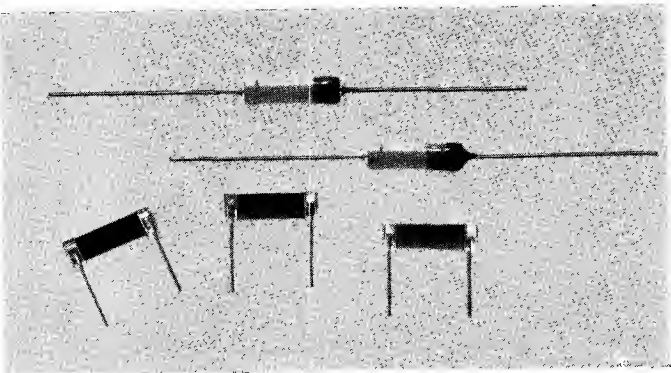
P.T.C. thermistors



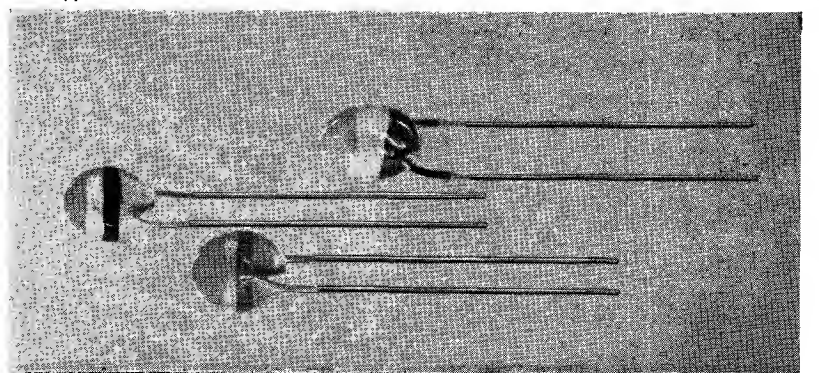
Asymmetric VDRs



Rod type VDRs



Disc type VDRs



voltage dependent book 3 part 1

Notes

- 1

The reverse characteristics of the asymmetric types are similar to a diode (forward characteristics only shown in the table). In view of the knee voltages, of these two devices (1 and 1.35 volts), they can be used as voltage reference devices to fill the gap left by conventional silicon diodes (0.5 volts) and the lower end of the voltage regulator (zener) diodes (3.3 volts).
- 2

The relationship between applied voltage and current flowing is given by : $E = CI^\beta$, where
E is in volts
I is in amperes
C is the applied voltage for a current of 1 ampere
 β is the slope of the characteristic.
- 3

These devices are not designed to pass 1 ampere. Therefore C and β are derived from measurements made at lower levels.
- 4

Maximum dissipation at 40°C ambient :
E298 Series : 700 mW
E299DD Series : 800 mW
E299DH/P230 : 3 W
2322 554 02221 : 2W
- 5

Maximum temperature at zero power
E295 Series : 70°C
E298 Series : 150°C
E299DD Series : 125°C
E299DH/P230 : 125°C
2322 554 02221 : 125°C



Non-linear resistors

voltage dependent (cont.) book 3 part 1

Type No.	Code No. 2322 ...	C (approx.) V	β value	Reference current mA	Reference voltage V	Diameter mm V	Thickness or length mm
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asymmetric types

E295ZZ/01	574 90001	1.6	0.05 to 0.08	1	1	9	4.6
E295ZZ/02	574 90002	2.4	0.06 to 0.09	1	1.35	9	4.6

Packing quantity : Multiples of 250 pieces.

rod types

E298ED/A258	564 02582	1550	0.20 to 0.25	10	470	5.2	28
*E298CD/A258	564 22582	1550	0.20 to 0.25	10	470	7.2	16.5
E298ED/A260	564 02602	1800	0.18 to 0.23	10	560	5.2	28
E298ED/A262	564 02622	2200	0.18 to 0.23	10	680	5.2	28
E298ED/A265	564 90014	2400	0.18 to 0.23	10	910	5.2	28
E298ED/P268	564 02681	3000	0.17 to 0.22	10	1200	5.2	28
*E298ZZ/05	564 90004	3020	0.16 to 0.21	2	950	7.2	16.5
E298ZZ/06	564 90005	3020	0.16 to 0.21	2	950	5.2	28

Packing quantity : Multiples of 100 pieces.

*Tag ended ; the remainder have axial leads

disc types

E299DD/P116	552 01161	14	0.25 to 0.4	100	8	15	5
E299DD/P118	552 01181	18	0.25 to 0.4	100	10	15	5
E299DD/P120	552 01201	21	0.25 to 0.4	100	12	15	5
E299DD/P216	552 02161	25	0.25 to 0.4	10	8	15	5
E299DD/P218	552 02181	32	0.25 to 0.4	10	10	15	5
E299DD/P220	552 02201	40	0.25 to 0.4	10	12	15	5
E299DD/P222	552 02221	48	0.25 to 0.4	10	15	15	5
E299DD/P224	552 02241	57	0.21 to 0.35	10	18	15	5
E299DD/P226	552 02261	60	0.21 to 0.35	10	22	15	5
E299DD/P228	552 02281	70	0.21 to 0.35	10	27	15	5
E299DD/P230	552 02301	85	0.18 to 0.25	10	33	15	5
E299DD/P232	552 02321	100	0.18 to 0.25	10	39	15	5
E299DD/P234	552 02341	130	0.18 to 0.25	10	47	15	5
E299DD/P236	552 02361	150	0.18 to 0.25	10	56	15	5
E299DD/P238	552 02381	180	0.18 to 0.25	10	68	15	5
E299DD/P336	552 03361	190	0.14 to 0.23	1	56	15	5
E299DD/P338	552 03381	230	0.14 to 0.23	1	68	15	5
E299DD/P340	552 03401	300	0.14 to 0.21	1	82	15	5
E299DD/P342	552 03421	350	0.14 to 0.21	1	100	15	5.5
E299DD/P344	552 03441	400	0.14 to 0.21	1	120	15	6
E299DD/P346	552 03461	500	0.14 to 0.21	1	150	15	6.5
E299DD/P348	552 03481	600	0.14 to 0.21	1	180	15	7
E299DD/P350	552 03501	750	0.14 to 0.21	1	220	15	7.5
E299DD/P352	552 03521	900	0.14 to 0.21	1	270	15	8
E299DD/P354	552 03541	1100	0.14 to 0.21	1	330	15	9
2322 554 02221	—	47	0.25 to 0.4	10	15	27.5	5
E299DH/P230	555 02301	84	0.18 to 0.25	10	33	42.5	5

Packing quantity : Multiples of 100 pieces, except as follows :

2322 554 02221 – 50 pieces

E299DH/P230 – 25 pieces



Radio and audio modules

f.m. tuner modules book 3 part 5

Type No.	Description	Supply voltage V	Frequency tuning range MHz	Power gain (100MHz) dB	Dimensions mm
LP1179 Series	f.m. tuner, mechanically tuned, with a.m. facility	+6.8	87.4 to 104.5	28	85 × 38 × 36
LP1186	f.m. tuner with diode tuning	+8	87.4 to 104.5	30	62 × 31 × 17
LP1402	f.m. tuner, mechanically tuned, with a.m. facility, double tuned i.f.	+6.8	87.4 to 104.5	28	85 × 38 × 36

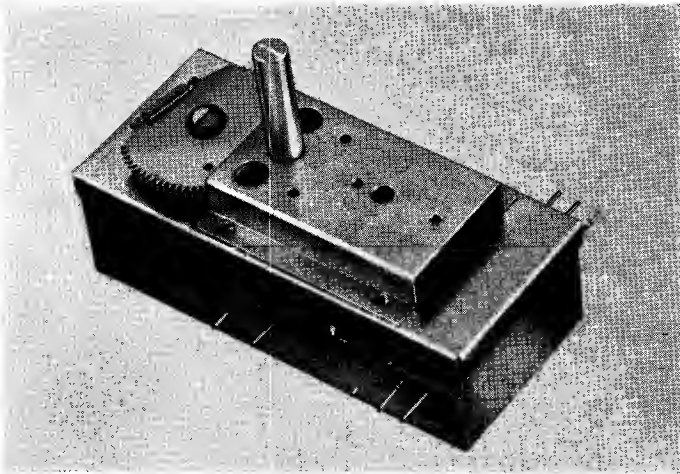
i.f. modules book 3 part 5

Type No.	Description	Supply voltage V	Supply current mA	Dimensions mm
LP1159	a.m. i.f. ; for medium, long and short wave receivers	−7.6	3.3	62 × 30 × 16
LP1164/1	a.m./f.m. i.f. ; a.m. section suitable for medium, long and short wave operation with external oscillator coil	+9.4	7	83 × 42 × 20
LP1170	a.m./f.m. i.f. ; a.m. section with oscillator coil, suitable for medium and long wave operation	+9.4	7	75 × 41 × 20
LP1181	a.m. i.f. ; for medium, long and short wave operation ; suitable for capacitive or permeability tuning	+7.6	5	62 × 30 × 16
LP1185	f.m. i.f. ; for mains or battery operation	+9	6.5	62 × 30 × 16

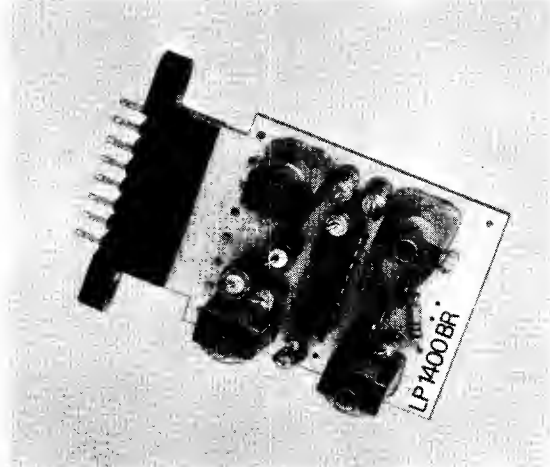
stereo decoder module book 3 part 5

Type No.	Description	Supply voltage V	Channel separation dB	Dimensions mm
LP1400	High performance stereo decoder using frequency multiplex system	8 to 18	40	61 × 43 × 31

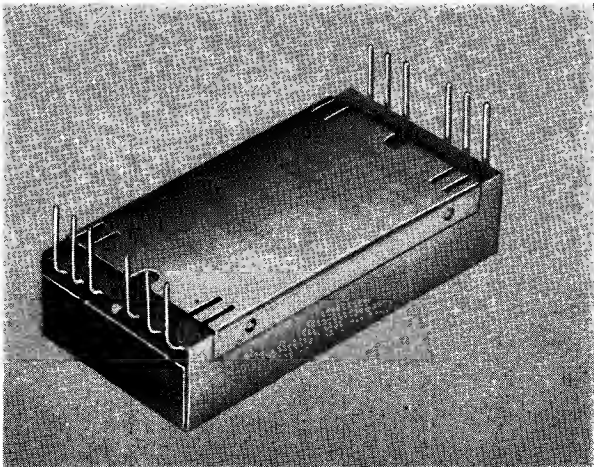
LP1179



LP1400



LP1181





Radio and audio modules

stereo pre-amplifier modules book 3 part 5

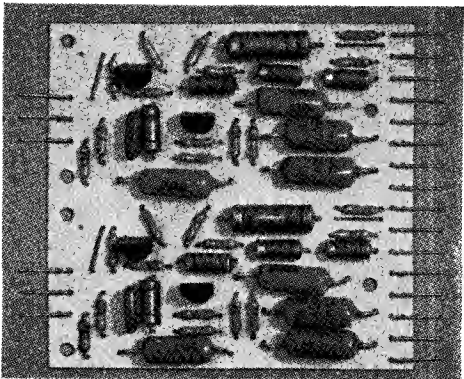
Type No.	Description	Supply voltage V	Supply current mA	Dimensions mm
LP1183/2	dual input ; for 10W systems, using ceramic or low output crystal pick-up heads	+24	0.6	84 × 82
LP1184/2	multi-input ; for 10W systems, incorporating a magnetic pick-up input and featuring very low distortion	+24	2.2	123 × 100

audio amplifier modules book 3 part 5

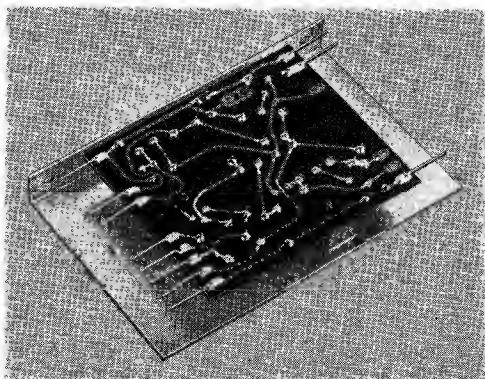
Type No.	Description	Supply voltage V	Supply current mA	Dimensions mm
*LP1162	4/5W capability into 12 or 8 Ω ; for mains radio and record player applications	-24	280 (12 Ω load) 340 (8 Ω load)	111 × 71 × 22
LP1173	10W capability into 4Ω ; for radiogram and unit audio applications	+24	770	112 × 70 × 29

*Available for current production ; not intended for new designs.

LP1183/2



LP1162





Television modules

voltage multiplying modules book 3 part 5

voltage doubler LP1193

Intended for use in transistor line output stages

$V_{in(pk)}$ nom.	10·6kV
V_{out} (e.h.t.) nom.	20kV
V_{out} (focus) nom.	10·6kV
I_{out} (e.h.t.) max.	750 μ A

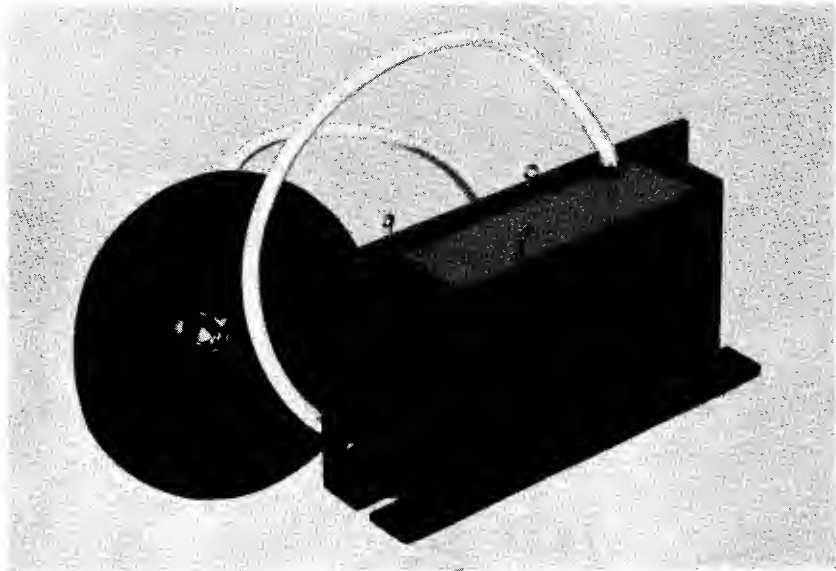
voltage triplers LP1194 Series

This series is intended for use in transistor line output stages.

LP1194/30	A five capacitor, five diode module with surge limiting resistor
LP1194/40	As LP1194/30, with a clipping diode across the input
LP1194/60	As LP1194/40, with a separate earth return lead for the clipping diode

	LP1194/30	LP1194/40	LP1194/60
$V_{in(pk)}$ nom.	8·9 kV	8·3 kV	8·6 kV
V_{out} (e.h.t.) nom.	25 kV	25 kV	25 kV
V_{out} (focus) nom.	7·2 kV	8·3 kV	7·7 kV
I_{out} (e.h.t.) max.	1·5 mA	1·5 mA	1·5 mA

LP1194





Television assemblies tuners (with diode tuning) book 3 part 5

Type No.	Channel coverage		Supply voltage V		Noise factor dB	Power gain dB
			transistors	tuning diodes		
ELC1042	v.h.f.	UK: 405, 625 CCIR	+12	+0.3 to +28	7	20
ELC1043/05	u.h.f.	21 to 69	+12	+0.3 to +25	7	22
ELC2000S	v.h.f./u.h.f.	C.C.I.R. E5 to E12 E2 to C E21 to E69	+12	+0.3 to +28	6 to 13 depending on channel	28 to 32 depending on channel

line linearity control units book 3 part 5

Type No.	Adjustment range V	Used with deflection coil	Application
AT4042/02	15 to 26	AT1040/00 and AT1027/AT1029 Series	Monochrome and 90° colour
AT4042/08	15 to 25	AT1062/01, AT1063/01	110° colour
AT4042/14	Fixed at 17	AT1040/15	Monochrome

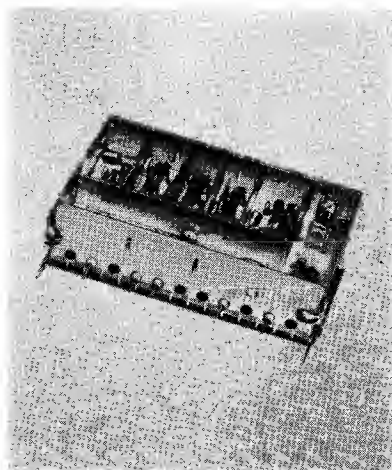
deflection coils (monochrome) book 3 part 5

Type No.	Line coil inductance mH	Field coil resistance (at 25°C) Ω	Deflection current (Ap-p) at 18kV, 61 cm (24 in.) reference tube		Used with linearity control	Thermistor (at 25°C) Ω
			line (for 495 mm deviation)	field (for 390 mm deviation)		
AT1040/00	2.1 parallel	30 series	2.82	0.545	AT4042/02	10
AT1040/15	3.3 parallel	7.5 parallel	2.3	1.09	AT4042/02 or/14	—

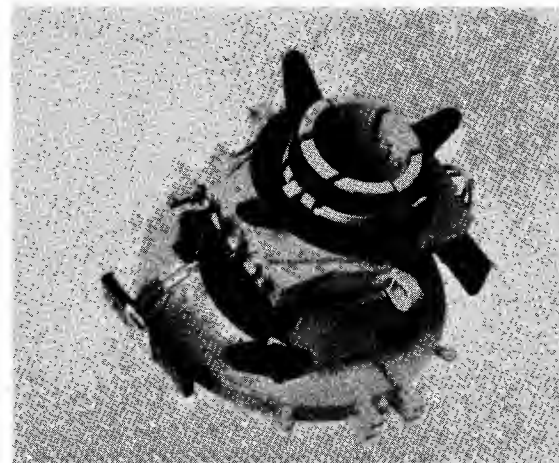
line output transformers (monochrome) book 3 part 5

Type No.	Drive	Used with deflection coil	E.H.T. kV	H.T. line V	Mounting
AT2036/00	PL504	AT1040/00	18	240	Printed board
AT2048/11	BU205	AT1040/15	18	150	Printed board

ELC1043/05



AT1040/15





Television assemblies

deflection coils (90° colour) book 3 part 5

Type No.	Picture tube cm	Used with	
		convergence unit	linearity control
AT1027/19	66 (26 in.)	AT4046 Series	AT4042/02
AT1029/19	56 (22 in.)	AT4046 Series	AT4042/02
Line coil inductance – parallel connected		2.95mH	
Field coil resistance – series connected		56 Ω	
– parallel connected		14 Ω + 6 Ω thermistor in parallel with 12 Ω resistor	
Deflection current with edge to edge scan (at 25 kV)			
– line (parallel)		2.6 A _{p-p}	
– field (parallel)		0.415 A _{p-p}	

Note : These deflection coils are normally supplied with integral convergence units (see below).

deflection coils (110° colour) book 3 part 5

Type No.	Picture tube cm	Used with	
		convergence unit	linearity control
AT1062/01	66 (26 in.)	AT4046 Series	AT4042/08
AT1063/01	56 (22 in.)	AT4046 Series	AT4042/08
Line coil inductance – parallel connected		1.2mH	
– series connected		4.7mH	
Field coil resistance – series connected		3.6Ω	
– parallel connected		14.2Ω + 2 × 4Ω thermistor	
Deflection current with edge to edge scan (at 25kV)			
– line (parallel)		6 A _{p-p}	
– field (parallel)		2.4 A _{p-p}	

combined deflection coils and convergence units (90° colour) book 3 part 5

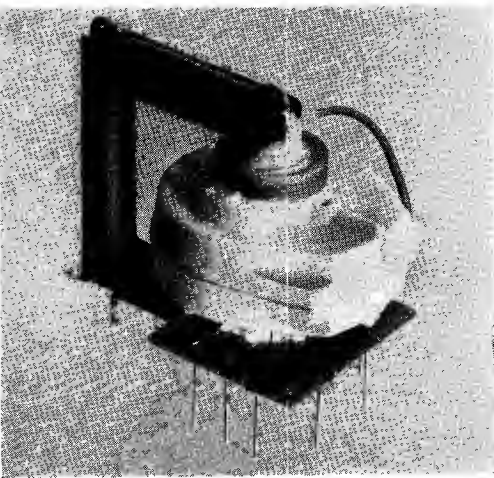
Type No. (combination)	Deflection coil	Convergence unit
AT1027/15	AT1027/19	AT4046/15
AT1029/15	AT1029/19	AT4046/15

Details of other deflection coil and convergence unit combinations are available upon request.

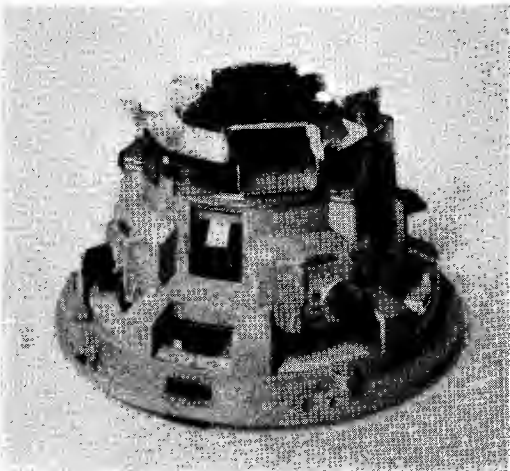
blue lateral units (colour) book 3 part 5

Type No.	Inductance mH		Resistance Ω	
	parallel	series	parallel	series
AT1025/05	0.63	3.2	9	36
AT1025/06	—	0.062	—	0.5
AT1025/08	0.3	—	3.2	—

AT2048/11



AT1062/01





Television assemblies

line output transformers (90° colour) book 3 part 5

Type No.	Drive	E.H.T. kV	E.H.T. generation	H.T. line V	Mounting
AT2055	PL509	25	Tripler	205	Chassis
AT2055/02	PL509	25	Tripler	295	Printed board

line output transformer (110° colour) book 3 part 5

Type No.	Drive	E.H.T. kV	E.H.T. generation	H.T. line V	Mounting
AT2063/00	BU208	25	Tripler	185	Printed board

raster correction transducers (colour) book 3 part 5

Type No.	V _{p-p}		Deflection coil connection		Used with North-South phase coil	Application
	line	field	line	field		
AT4041/37	1400	55	parallel	parallel	AT4040/50	90°
	1400	110	parallel	series	AT4040/55	90°
AT4041/40	400	210	parallel	series	AT4040/87	110°

bridge coil (110° colour) book 3 part 5

Type No.	Primary inductance μH	Maximum current A _{p-p}
AT4043/86	285	6

correction adjustment coils (colour) book 3 part 5

AT4040 Series

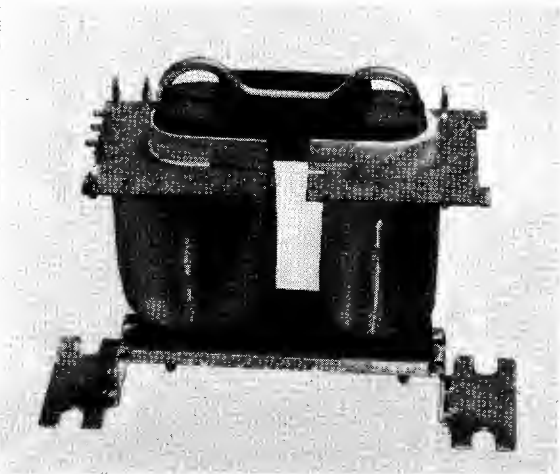
This range has been designed for use with other Mullard television components and assemblies as correction (waveform realignment) and adjustment (waveform balancing) coils in colour television circuits. Full details may be obtained from the appropriate data sheet in Mullard Technical Handbook. Book 3, Part 5.

delay line (colour) book 3 part 5

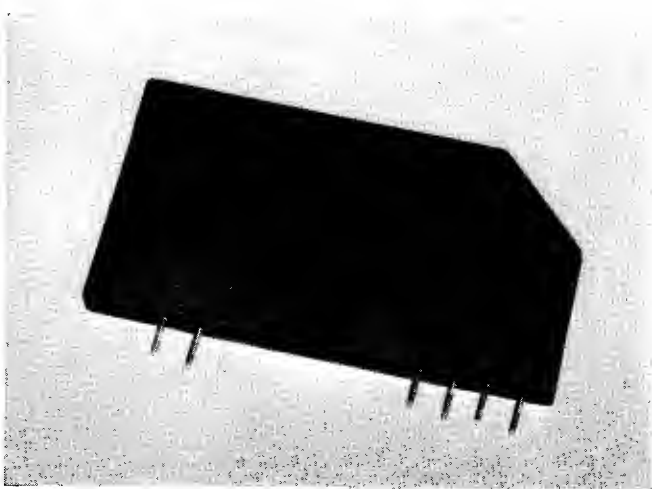
Type No.	Phase delay time μs	Insertion loss dB	Unwanted reflections relative to 1 τ signal (dB)		Temperature range
			3τ	others	
DL50	63-943	8	-22 max	-30 max	-20 to +70°C

DL50 uses separate coils AT4044/00 (input) and AT4044/01 (output)

AT2055



DL50





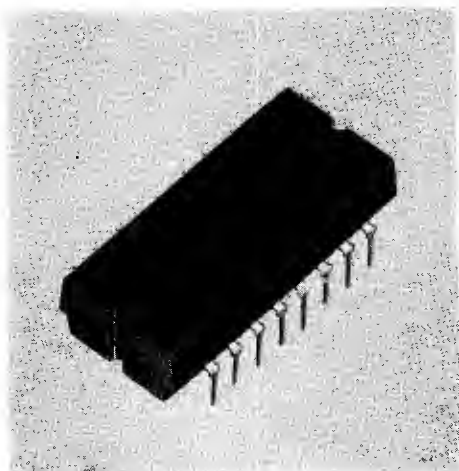
Solid state control elements

Norbit 2 series book 3 part 6

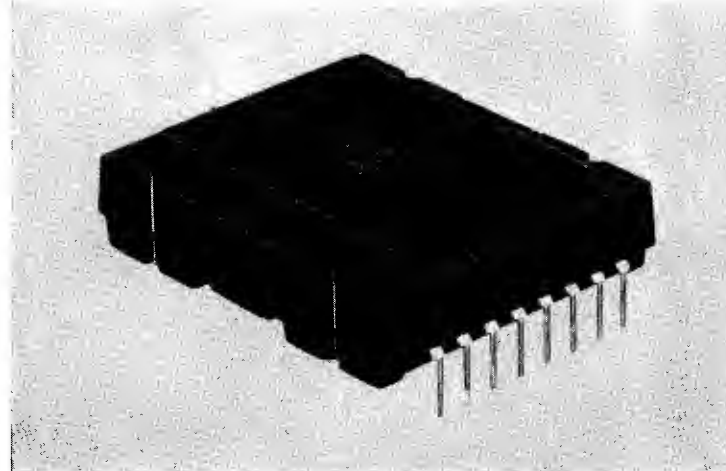
Type No.	Description	Function	Colour
2NOR60	Twin NOR	Basic logic elements	Black
4NOR60	Quadruple NOR	Basic logic elements	Black
2IA60	Twin inverter amplifier (or low power output)	High fan-out amplifier (100mA output unit)	Blue
2LPA60	Twin low power output	100mA each output	Blue
PA60	Available for current production ; for new designs see HPA60 and UPA61		
HPA60	High power output	2.5A output unit	Black
GLD60	Grounded load driver	Output unit	Black
2SF60	Twin input switch filter	Interference suppression	Green
TU60	Timer	Time delay	Red
PS90	Pulse shaper	Input unit	Green
FF90	Flip-flop	Counter/shift register	Red
2TG90	Twin trigger gate	Extends facilities for FF90	Red
PSU61	Power supply	500mA at 24V d.c. ; 25mA at 100V d.c. 146 × 80 × 76	

Dimensions (mm): 50.8 × 25.4 × 14 except PA60 and HPA60 which are 50.8 × 63.5 × 16.5
 Power supply: Single rail un stabilised +24V d.c. ±25% Temperature range: -10 to +85°C Operating speed: 10kHz

All modules except HPA60



HPA60





Solid state control elements

thyristor trigger and control modules, 61 series

book 3 part 6

Type No.	Description	Function
TT61	Trigger transformer	Interface, giving two isolated outputs for use between thyristor or triac gates and control sections.
UPA61	Universal power amplifier	(a) Pulse generator for driving TT61 (b) D.C. driver (c) Other circuit functions.
RSA61	Rectifier and synchroniser	Provides power supplies and synchronising signals.
DOA61	Differential operational amplifier	For use in closed loop control systems.
2NOR61	Twin NOR	For logic functions.

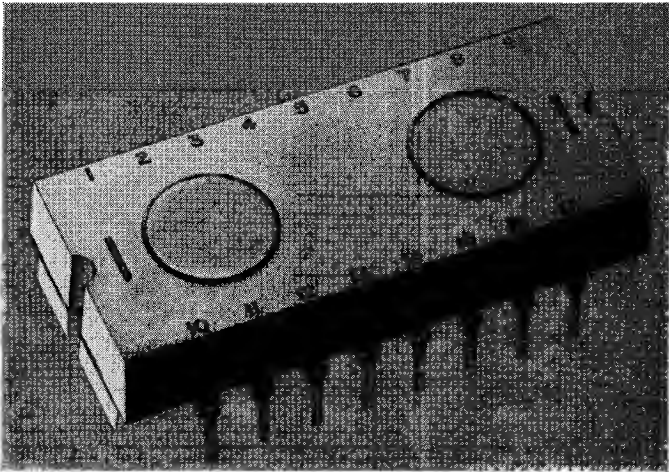
Dimensions (mm): 50.8 x 25.4 x 14

Colour: Black

Maximum working temperature: +70°C

For mounting accessories of Norbit 2 and 61 Series, please contact Mullard Ltd.

61 Series





Solid state control elements

display counters, 50 series book 3 part 6

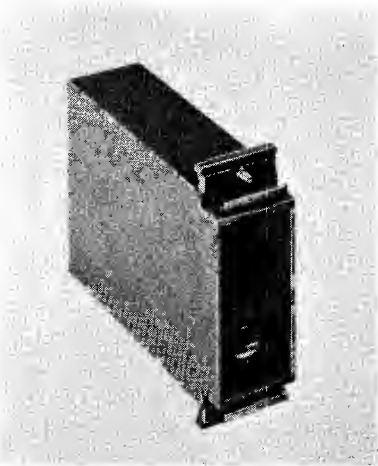
Type No.	Description	Dimensions mm
NIC50	Decade counter	89 × 63 × 25·2
RIC50	Bi-directional counter	89 × 63 × 25·2
MID50	Memory indicator	89 × 63 × 25·2
SID50	Sign indicator +, −, ~, x, y or z	89 × 63 × 25·2
PSR50	Pulse shaper	52 × 48 × 12·6
3NOR50	3 × NOR gate	52 × 48 × 12·6
4NOR51	4 × NOR gate	52 × 48 × 12·6
LRD50	Lamp/relay driver	52 × 48 × 12·6
PDU50A	Printer drive unit	52 × 48 × 12·6
PDU50B	Scan circuit unit	52 × 48 × 12·6

Power supply : +24V d.c. ±10%; 250mA
 Temperature range : −25 to +70°C
 Operating speed : 50kHz max.

Accessories for 50 series

Type No.	Description	Dimensions mm
PSU50	Power supply unit	170 × 140 × 87
ECA50	Empty case assembly	52 × 48 × 12·6
MB50	Mounting bar	265 long
FIC1	Facade for one display unit	66 × 35·4
FIC2	Facade for two display units	66 × 60·8
FIC3	Facade for three display units	66 × 86·2
FIC4	Facade for four display units	66 × 111·6
FIC5	Facade for five display units	66 × 137
FIC6	Facade for six display units	66 × 162·4

NIC 50



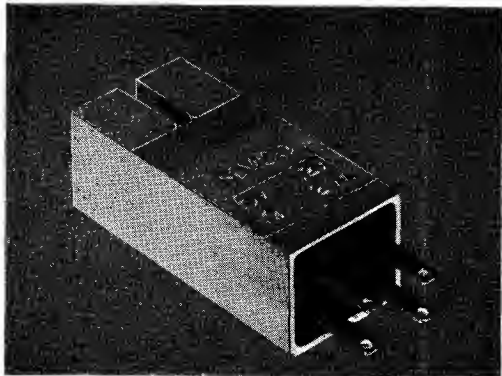


Solid state control elements

input devices book 3 part 6

Type No.	Description	Temperature range	Speed of operation	Working range	Power supply	Dimensions mm
VSD	Vane switched detector	-20 to +85°C	1kHz	—	12V ± 5%	92 × 23 × 23
MVSO	Miniature version of VSD	-25 to +85°C	3kHz	—	12V ± 5% 24V ± 25%	41 × 19 × 15
PSD12 PSD24	Proximity switched detector (PSD)	-25 to +85°C	100Hz	10 mm	12V ± 5% 24V ± 25%	102.5 × 31 × 31
EPD60	Miniature version of PSD	-25 to +70°C	1kHz	—	12V ± 5% 24V ± 25%	50 × 30 × 17.6

MVSO



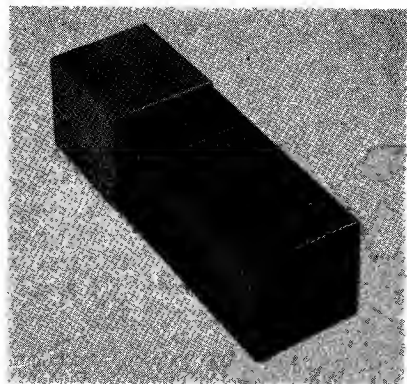
EPD60



VSD



PSD



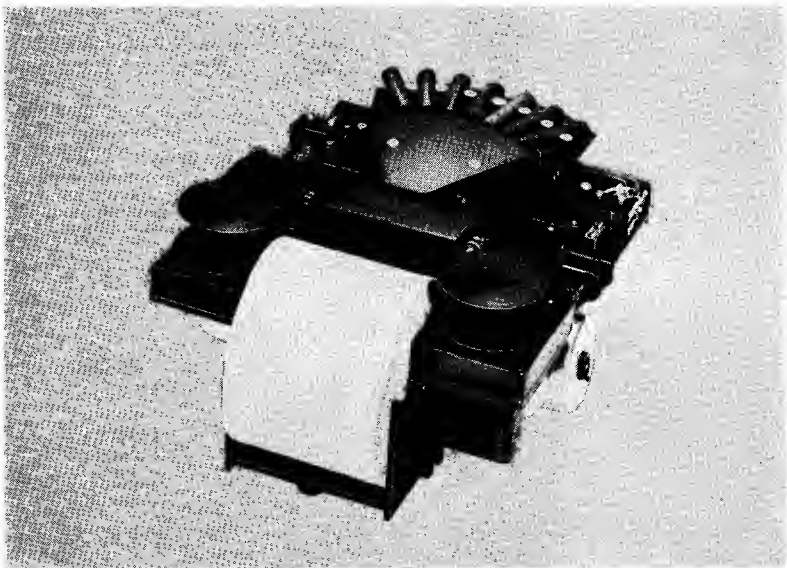


Mosaic printers book 3 part 6

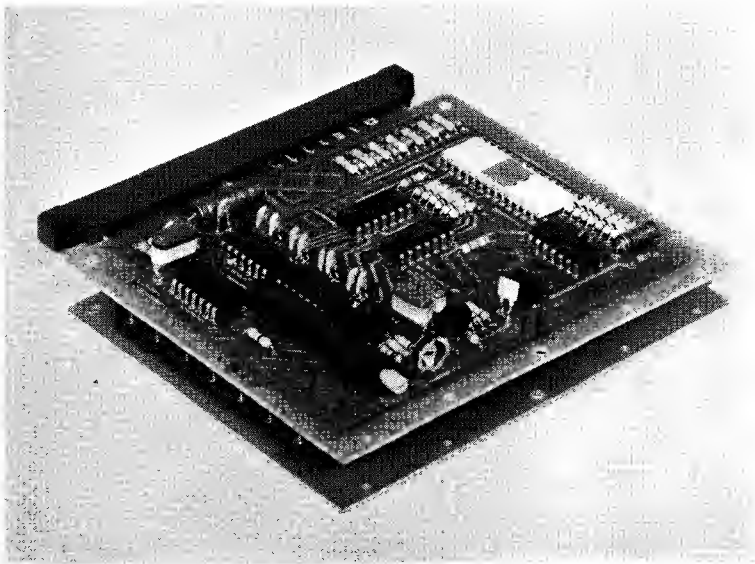
Type No.	Paper	Columns per line	Printing speed	Dimensions mm
60SA	Self-action	20	50 characters per second 1 line per second	221 × 148 × 80
60SR	Plain, ink ribbon	20	50 characters per second 1 line per second	240 × 148 × 80
Either of the above printers should be used with the following character module:				
Type No.	Characters	TTL compatible input		Dimensions mm
CM64	Full alpha numeric (64 characters)	6 bits ASCII		Two boards 117 × 110

A 7 × 5 dot matrix is used to form characters which must be supplied serially as demanded by the character module. The printer takes 60 mm wide paper rolls.

Mosaic printer



CM 64



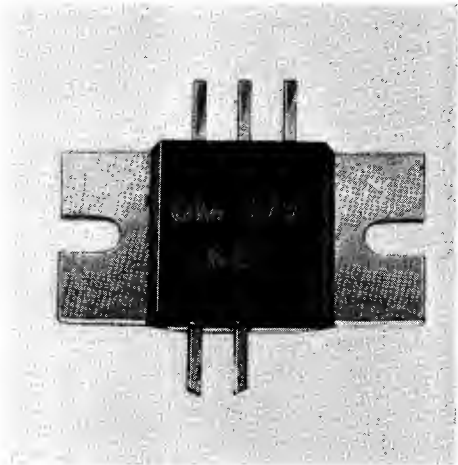


Hybrid v.h.f./u.h.f. wideband amplifiers

A range of hybrid v.h.f./u.h.f. wideband amplifiers designed for use in MATV systems for the frequency range 40 to 860MHz. D.C. power requirements are 24V \pm 10%, and source and load impedances are 75 Ω .

Type No.	Description	Transducer gain dB	Flatness of response dB	Noise figure dB	Dimensions mm
OM175	2-stage amplifier for use as a distribution amplifier	15	0.5	7	40 x 22 x 6
OM180	2-stage amplifier for use as a booster amplifier and as a preamplifier for OM175	16	0.2 v.h.f. 1.4 u.h.f.	5.5	30 x 12 x 6
OM185	3-stage amplifier for use as a booster amplifier and as a preamplifier for OM175	25	0.3 v.h.f. 1.6 u.h.f.	5.5	30 x 12 x 6
OM190	2-stage amplifier for use as a booster amplifier and as a preamplifier for OM175	17	0.2 v.h.f. 1.4 u.h.f.	7	30 x 12 x 6

Hybrid v.h.f./u.h.f. wideband amplifiers.





Ferroxcube

linear ferrite materials book 3 part 2

Ferroxcube cores are produced mainly in the following material grades :

For use in pot cores and RM cores :

- Grade A8 A high permeability material suitable for pulse applications, where the pulse repetition frequency is less than about 500kHz, and for wideband applications where the lowest frequency to be transmitted is less than 1 MHz.
- Grade A10 This is a low loss high stability material for use at frequencies between 200kHz and 2MHz.
- Grade A13 A very low loss, high permeability, high stability material. It is used in the form of pot cores for inductors operating at frequencies up to 300kHz and for transformers where the lowest frequency to be transmitted is less than 10MHz.
- Grade B10 A low loss high stability material for use in the frequency range 1 to 15MHz. It is normally available in the form of pot cores for inductor and transformer applications.

For use in television, switched-mode power supplies and inverters :

- Grade A9 Suitable for low frequency power applications where a high operating flux density and low total core loss is required to be maintained at elevated temperatures, e.g. tv line output transformers and inverters. This material can be used at frequencies up to 100kHz and is normally available in U-core form.
- Grade A16 This material has similar properties to grade A9 but has lower losses.

For use in yoke rings in television scanning assemblies :

- Grade A3 Exclusively for the manufacture of yoke rings used in television scanning assemblies.

cores for power applications book 3 part 2

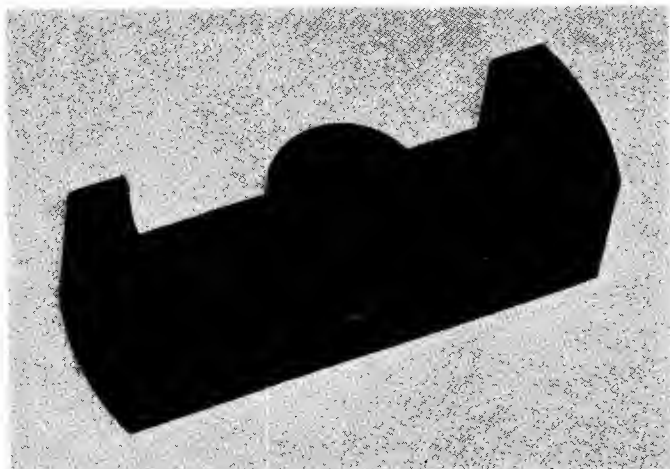
for use in television

Type No.	Shape	Minimum amplitude permeability (μ_a) for a pair of cores $f < 50\text{Hz}$, $\theta = 25^\circ\text{C}$	Dimensions mm			Other features and applications
			length	height	width	
FX2527	E core	1000 at 400mT	56	16	19	Round centre leg
FX3560	E core	1000 at 420mT	56	18	19	Round centre leg
FX3567	E core	1000 at 420mT	44	18	19	Round centre leg
FX3308	30mm pot core	800 at 340mT	\varnothing 30	9.5	—	
FX3550	RM10 core	1000 at 330mT	\square 24	9.4	—	
FX2507	U core	1000 at 400mT	60	29	16	
FX3558	U core	1000 at 420mT	60	29	16	
FX3588	U core	1000 at 420mT	67	35	19	
FX3187/88	U and I combination	1000 at 400mT	67	71	19	μ_a for U and I combination

yoke rings

Type No.	Application : For scanning coils in television picture tubes	Dimensions mm			
		o.d.	i.d.	height	
FX3160	90° (colour)	108	49	50	Yoke rings
FX3251	110° (mono)	57	40	26	Yoke rings

E core





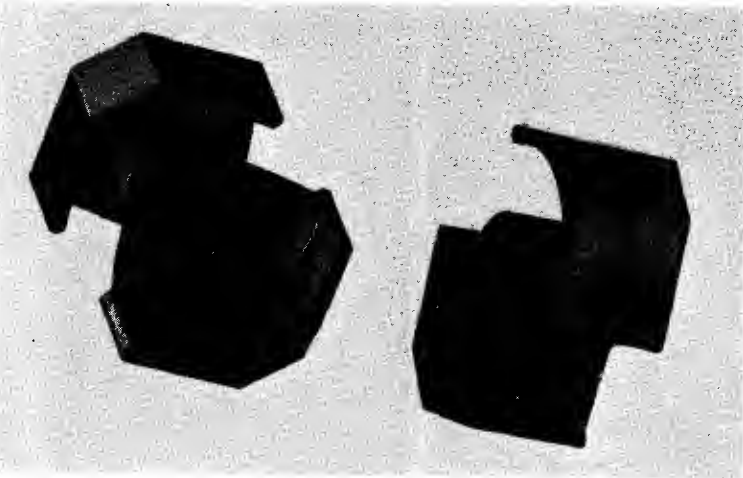
Ferroxcube

cores for power applications (cont.) book 3 part 2

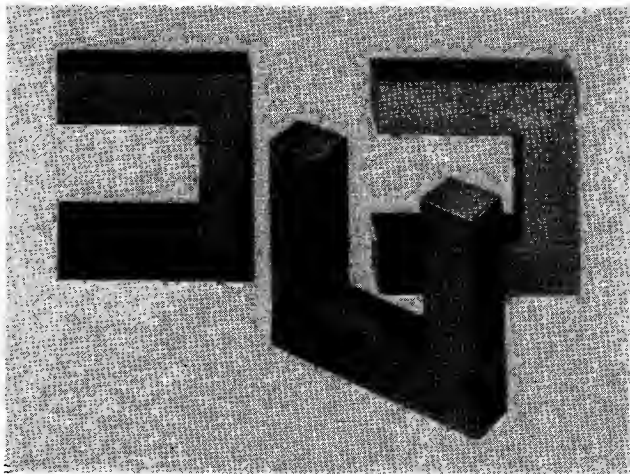
for use in switched-mode power supplies and inverters :

Type No.	Shape	Coil former type No.	Minimum amplitude permeability (μ_a) for a pair of cores $f < 50\text{Hz}$, $\theta = 25^\circ\text{C}$	Dimensions mm			Other features and applications
				length	height	width	
FX3560	E core	—	1000 at 420 mT	56	18	19	Round centre leg
FX3720	E core	DT2720	1000 at 300mT	34·5	17·3	9·5	Round centre leg
FX3730	E core	DT2730	1000 at 300mT	40·6	19·5	11·6	Round centre leg
FX3740	E core	DT2740	1000 at 300mT	52·2	24·2	13·4	Round centre leg
FX3750	E core	DT2750	1000 at 300mT	70	34·5	16·4	Round centre leg
FX3550	RM10 core	—	1000 at 330mT	□ 24	9·4	—	—
FX3234	U core	—	1000 at 400mT	60	35	15	—
FX3235	U core	—	1000 at 400mT	60	55	15	—

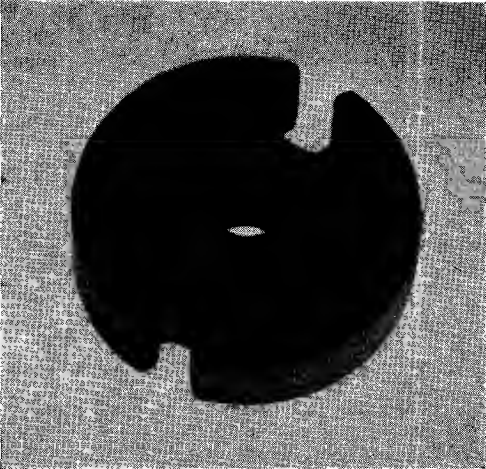
RM10 cores



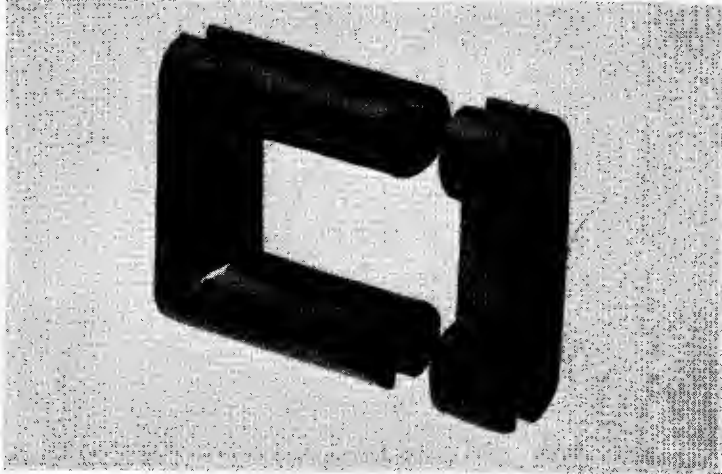
Power U-cores



Pot core



U and I combination





Ferroxcube

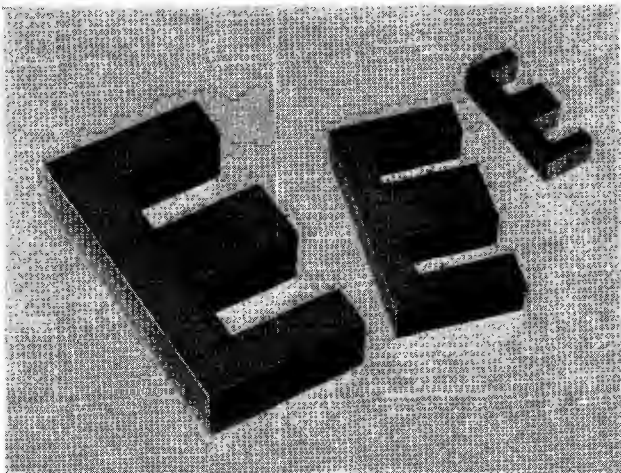
cores for small signal applications book 3 part 2

E and I cores					
Type No.		Minimum effective permeability (μ_e) for two 'E' cores at 25° C	Dimensions mm for two E cores or an E and I combination		
E core	I core		length	height	width
FX1052	*FX1053	900 (700 for E and I)	13	13 (2, E's) 10 (E and I)	3
FX1652		1020	20	19	5
FX1238		1100	25	19	6
FX1007	FX1107	1150 (1150 for E and I)	41	44 (2, E's) 28 (E and I)	9
FX1239		1150	34	26	8
FX1818		1150	42	35	9
FX1314		1150	52	60	12
FX1819	*FX2318	1150 (1150 for E and I)	56	58 (2, E's) 42 (E and I)	13
FX1073		1150	34	20	12
FX1105		1150	30	25	12
FX1653		1150	90	63	24
FX1315		1150	40	48	15

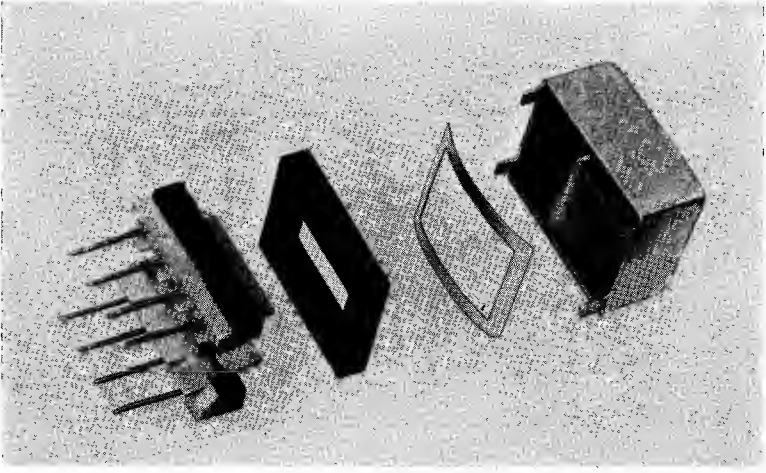
* Available for current production ; not intended for new designs.

H core assemblies					
Type No.	Minimum effective permeability (μ_e) at 25°C	Dimensions mm			No. of pins
		length	width	height	
LA1366 (H7)	3000	7.5	10	4.8	6
LA1246 (H10)	3820	12.4	11.2	6.1	8
LA1302 (H20)	3850	20	20	15.2	8

E cores



H core assembly



Ferroxcube

cores for small signal applications (cont.) book 3 part 2

pot and RM transformer cores

Designation	Dimensions mm		Design types				Current types*	
			A13		A8		A5	
	size	height	Type No.	AL min.	Type No.	AL $\pm 25\%$	Type No.	μ_e min.
10mm	Ø 10	7	FX2501	1205	FX3280	3325	—	—
12mm	Ø 12	8	—	—	—	—	FX2502	900
RM6-S	□ 14.4	12.4	FX3432	1930	FX3437 LA1522	4400 5500	—	—
RM6-R	□ 14.4	12.4	FX3433	2000	FX3438	4750	—	—
14mm	Ø 14	9	—	—	—	—	FX2236	950
RM7	□ 16.9	13.4	FX3434	2230	FX3439	5600	—	—
18mm	Ø 18	11	—	—	—	—	FX2238	1150
RM8	□ 19.4	16.4	FX3435	2400	FX3440	6300	—	—
21mm	Ø 21	14	—	—	—	—	FX2239	1150
RM10	□ 24.1	18.6	FX3436	3260	FX3441	8600	—	—
25mm	Ø 25	16	—	—	—	—	FX2240	1200
30mm	Ø 30	19	FX2241	5815	FX3286	15 000	—	—
35mm	Ø 35	23	FX2242	6950	FX3287	17 800	—	—
45mm	Ø 45	29	FX2243	8830	FX3288	20 000	—	—

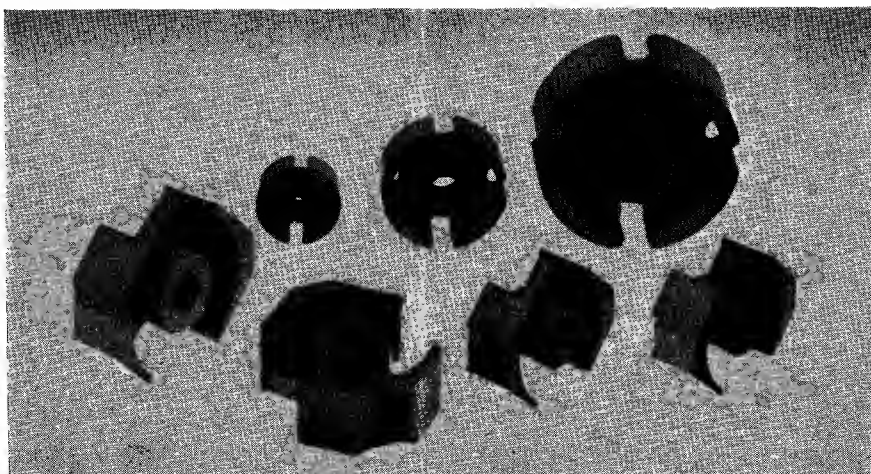
*Available for current production ; not intended for new designs.

Accessories : Accessories are available. Please refer to Mullard Technical Handbook for details.

cross cores

Type No.	Minimum effective permeability (μ_e) at 25°C	Dimensions mm			
		length	width	height (pair)	centre hole
FX2856 (X 22)	1440	21.3	21.3	14.2	Ø 3
FX2857 (X 30)	1525	29.6	29.6	23.6	Ø 4.5
FX2858 (X 35)	1580	34.6	34.6	28	Ø 5.5

Pot and RM cores



Cross core assembly





Ferroxcube

cores for small signal applications (cont.) book 3 part 2

screening beads

Ferroxcube beads with 1, 2 or 6 holes can be used to introduce, in a simple way, additional impedance for the suppression of unwanted parasitic oscillations, or to provide screening.

Type No.	No. of holes	Dimensions		Minimum hole diameter mm	Minimum suppression frequency MHz
		Maximum diameter mm	Maximum length mm		
FX1115	1	4.2	5.5	1.8	1
FX1242	1	4.1	5.7	1.3	10

Type No.	No. of holes	Dimensions		Minimum hole diameter mm	Minimum suppression frequency MHz
		Maximum diameter mm	Maximum length mm		
FX1516	2	5.9	12.4	0.7	10
FX1898	6	6.3	10.5	0.6	10

single and double aperture cores

Type No.		Minimum effective permeability (μ_e) at 25°C	Colour mark	Dimensions mm				
				diameter	length	width	height	aperture
FX2431	Single aperture	500	—	8	—	—	6	Ø 2
FX2633	Single aperture	1500	—	8	—	—	6	Ø 2
FX2049	Double aperture	200	white	—	13	8	6	Ø 3
FX2249	Double aperture	500	white	—	10.8	5.4	10.9	□ 2
*FX2634	Double aperture	1500	red	—	10.8	5.4	10.9	□ 2
FX2754	Double aperture	1400	red	—	13	8	6	Ø 3
FX2837	Double aperture	3000	yellow	—	10.8	5.4	10.9	□ 2
FX3316	Double aperture	3000	—	—	10.8	5.4	6	□ 2
FX3391	Double aperture	1400	—	—	10.8	5.4	6	□ 2

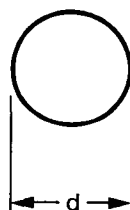
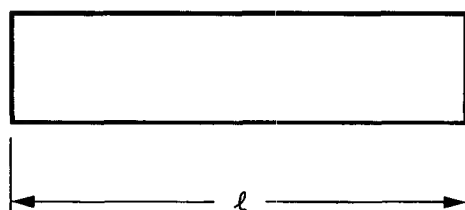
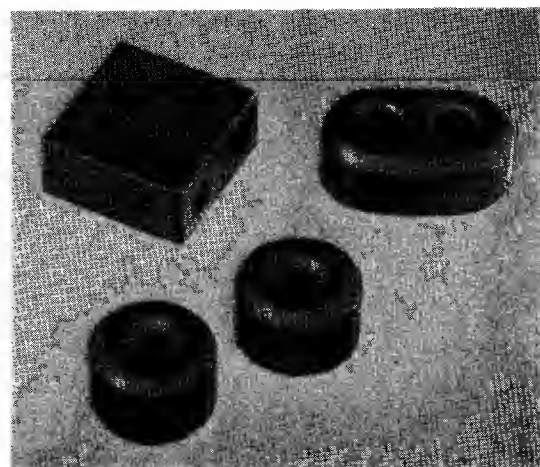
*Available for current production ; not intended for new designs (replaced by FX3316).

rods

Type No.	Material grade	Dimensions mm	
		d	ℓ
*FX2902	B2	1.6	12
*FX1433	B5	1.6	14
*FX2917	B2	1.6	17.1
*FX3245	B5	3	10
FX3225	B2	6	25.4
FX1089	A4	6.4	31.8
*FX1099	A4	6.4	51.8
*FX1130	A1	6.4	25.4
*FX1807	B2	9	30.5
FX1169	A4	12.7	50.8
*FX1172	A4	12.7	76.2

*Available for current production ; not intended for new designs.

Single and double aperture cores



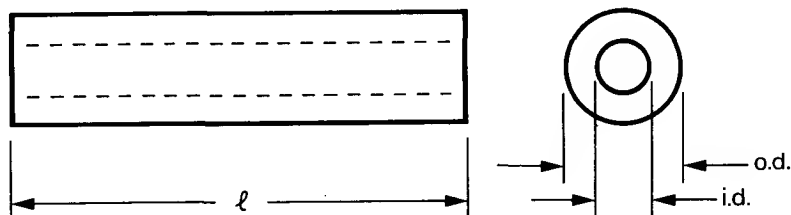
Ferroxcube

cores for small signal applications (cont.) book 3 part 2

tubes

Type No.	Material grade	Dimensions mm		
		o.d.	i.d.	ℓ
FX1483	A1	3.6	2.5	14.3
FX1242	B2	4	1.5	5.5
*FX1068	A4	4	1.5	32
*FX1164	A1	4	1.5	25.4
FX1054	A4	4	1.5	51
FX1115	A1	4	2	5
FX1272	A1	4	2	14
*FX1156	A1	4.1	1.5	19
*FX1060	A1	4.2	2.1	7
FX1098	A4	4.2	2.3	7
*FX2343	B5	4.7	2	19
*FX1208	A1	5.6	1.5	31.8
*FX1159	A4	6.4	1.5	50.8
FX1447	A4	6.4	2	30
FX1243	A4	7.5	4.5	17
FX1128	A1	9.5	6.5	17
FX1276	A4	11	9	59.7

*Available for current production ; not intended for new designs.

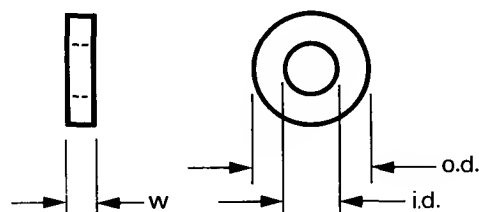


toroids

Uncoated types				
Type No.	Material grade	Dimensions mm		
		o.d.	i.d.	w
FX3237	A15	2	1.3	0.7
FX2073	A5	5	2.9	1.2
FX1886	B5	5.2	3.1	1
FX1593	A4	12.7	6.3	3.2
FX1594	B1	12.7	6.3	3.2
FX1595	B2	12.7	6.3	3.2
FX1598	B5	12.7	6.3	3.2
FX2691	A5	12.7	6.3	3.2
FX3311	A8	12.7	6.4	3.2
FX2395	A4	38.1	25.4	19
FX1582	A4	25.4	19	4.8
FX3312	A8	25.4	19	4.8
FX1586	A4	38.1	25.4	6.3
FX1587	B1	38.1	25.4	6.3
FX1588	B2	38.1	25.4	6.3
FX1589	B3	38.1	25.4	6.3
FX1590	B4	38.1	25.4	6.3
FX3313	A8	38.1	25.4	6.3
FX1076	A4	108	70	12.7

Coated types

Type No.	Material grade	Uncoated dimensions mm		
		o.d.	i.d.	w
FX3238	A15	4	2.2	1.1
FX3239	A15	6	4	2
FX3240	A15	9	6	3
FX3008	A4	12.7	6.3	3.2
FX3009	A5	12.7	6.3	3.2
FX3012	B2	12.7	6.3	3.2





Ferroxcube

RM inductor cores book 3 part 4

RM5 range		
Violet range		
Type No.	Inductance factor A_L (nH)	Standard adjuster
RM5A13AL250	250	LA1519
RM5A13AL160	160	LA1495
RM5A13AL100	100	LA1494
LA4000 Series		

The LA4000 'RM' range of high quality inductor cores for direct mounting on printed wiring boards, is designed to achieve a greater packing density and to reduce the time and cost of assembly. Each core consists of two halves, held together by metal clips, thus providing a quick and easy method of assembly on a printed wiring board with a grid spacing of 2.54 mm (0.1 in) by means of pins in the coil former.

Violet range				Red range		
Size	Type No.	Inductance factor A_L (nH)	Standard adjuster	Type No.	Inductance factor A_L (nH)	Standard adjuster
RM6-R	LA4145	400	LA1501	LA4128	100	LA1500
	LA4146	250	LA1429	LA4129	63	LA1500
	LA4147	160	LA1429	LA4130	40	LA1500
	LA4148	100	LA1500	—	—	—
RM7	LA4245	400	LA1400	LA4228	100	LA1427
	LA4246	250	LA1399	LA4229	63	LA1427
	LA4247	160	LA1399	LA4230	40	LA1427
	LA4248	100	LA1427	—	—	—
RM8	LA4344	630	LA1430	LA4328	100	LA1431
	LA4345	400	LA1424	LA4329	63	LA1431
	LA4346	250	LA1424	—	—	—
	LA4347	160	LA1431	—	—	—
RM10	LA4348	100	LA1431	—	—	—
	LA4543	1000	LA1433	LA4528	100	LA1432
	LA4544	630	LA1428	LA4529	63	LA1432
	LA4545	400	LA1428	—	—	—
	LA4546	250	LA1432	—	—	—
	LA4547	160	LA1432	—	—	—

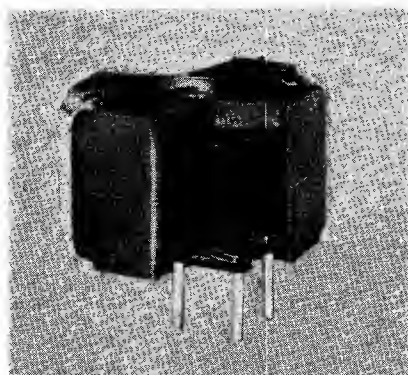
Accessories

Size	Coil formers			Clip	Aligning plug	Non-magnetic screwdriver
	1 section	No. of pins	2 section			
RM5	RM5B0BS/S6P	6	—	† RM4/5 CLIP	—	—
RM6-R	DT2467	4	—	DT2398	DT2415	DT2452
	DT2517	6	DT2477	† DT2498	—	—
RM7	DT2468	4	—	DT2387	DT2453	DT2452
	* DT2391	5	* DT2522	† DT2487	—	—
RM8	DT2392	8	DT2523	DT2396	DT2411	DT2410
	DT2470	4	—	† DT2496	—	—
RM10	DT2480	8	DT2481	DT2406	DT2412	DT2410
	DT2534	5	* DT2538	† DT2506	—	—
	DT2535	8	DT2539	—	—	—

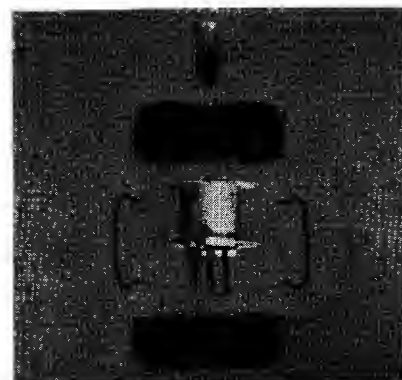
*Available for current production, not intended for new designs.

†With earthing tag

RM inductor cores



RM inductor cores



Ferroxcube

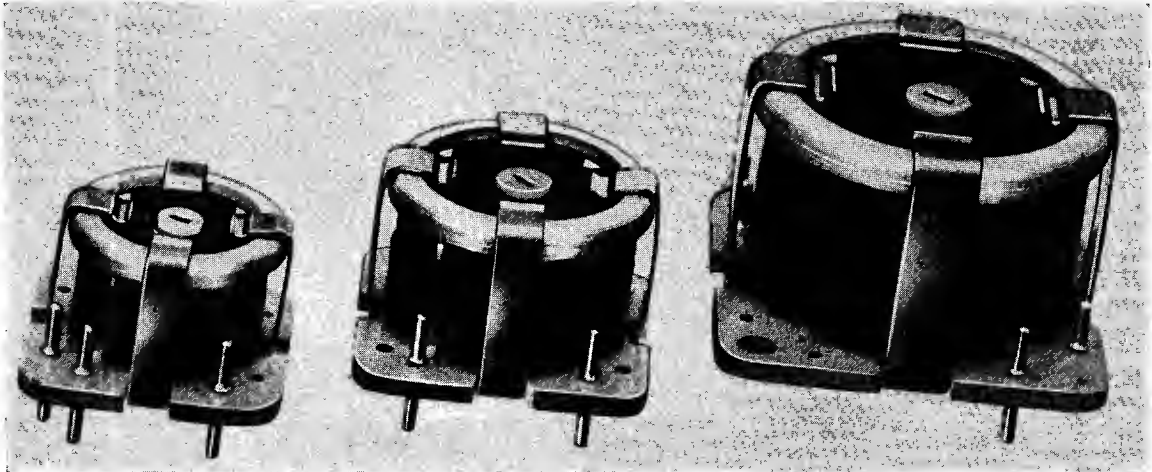
Vinkor pot cores (to BS4061 range 1) book 3 part 3

Violet range			Red range		Blue range	
Size mm	Type No.	Effective permeability (μ_e) with adjuster in mid-range position	Type No.	Effective permeability (μ_e) with adjuster in mid-range position	Type No.	Inductance factor (A_L) nH
10	LA1421	100			LA1378	33.8
	LA1422	63			LA1379	32.0
	LA1423	40			LA1380	30.0
12	*LA1418	100				
	*LA1419	63				
	*LA1420	40				
14	*LA1228	250	*LA1157	63	LA1375	55.0
	*LA1229	160	*LA1158	40	LA1376	45.7
	*LA1230	100			LA1377	37.0
	*LA1417	63				
18	*LA1225	250	*LA1161	63	LA1372	76.2
	*LA1226	160	*LA1162	40	LA1373	59.4
	*LA1227	100	*LA1163	25	LA1374	45.4
	*LA1416	63				
21	*LA1222	250	*LA1164	63		
	*LA1223	160	*LA1165	40		
	*LA1224	100	*LA1166	25		
	*LA1415	63				
25	*LA1218	400	*LA1167	63		
	*LA1219	250	*LA1168	40		
	*LA1220	160	*LA1169	25		
	*LA1221	100				
	*LA1414	63				
30	LA1214	400	LA1170	63		
	LA1215	250	LA1171	40		
	LA1216	160	LA1172	25		
	LA1217	100				
	LA1413	63				
35	LA1210	400	LA1173	63		
	LA1211	250	LA1174	40		
	LA1212	160	LA1175	25		
	LA1213	100				
	LA1412	63				
45	LA1409	250				
	LA1410	160				
	LA1411	100				

The Mullard BLUE RANGE is supplied with specially adjusted A_L values to avoid integral turn problems at low inductance values.

*Available for current production, for new designs see RM inductor cores.

Vinkor pot cores



Accessories :
Accessories are available.
Please refer to Technical Handbook for details.



PXE piezoelectric ceramic components

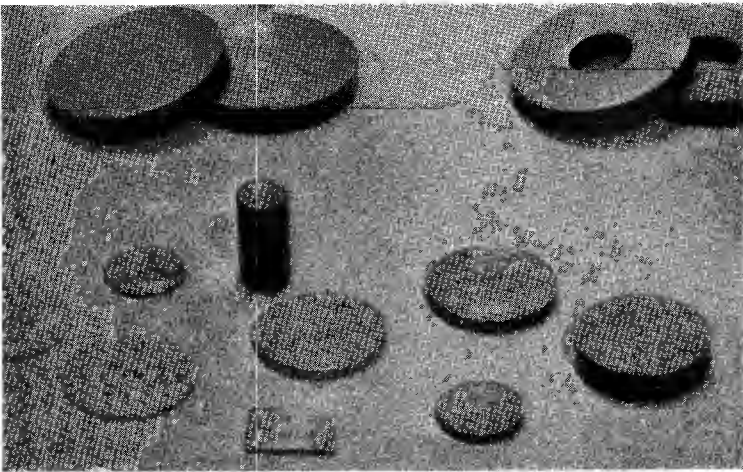
Piezoelectricity is 'pressure' electricity, a property of certain crystalline materials and of man-made polycrystalline ceramic materials. It provides for the designer, a simple, direct method for electro-mechanical, and reverse, energy transformations. Mullard have introduced into their range of electrical ceramics piezoelectric elements chosen from three main grades of material. These elements are robust and have a high mechanical stiffness. They have the advantage that element shapes and their piezoelectric properties are formed during manufacture, and can be chosen to meet the requirements of particular applications. There are many fields in which modern piezoelectric elements have already been applied, and these materials are now of increasing importance to industry.

material properties book 3 part 2

Material		PXE4	PXE5	PXE6	PXE7	PXE11	PXE21	PXE22	PXE41	*PXE51	Units
Mechanical data											
Density		7.5	7.6	7.7	7.75	4.5	7.75	7.75	7.9	7.7	10 ³ kg/m ³
Curie temperature θ_c		265	285	370	320	180, 400†	270	270	315	220	°C
Electrical data											
Relative permittivity ϵ_r		1750	1800	600	700	400	1750	2250	1200	2300	—
Dielectric dissipation factor $\tan \delta$		6	16	8	20	25	16	16	2.5	16	10 ^{−3}
Electromechanical data											
Coupling coefficients	k_p	0.55	0.58	0.32	0.52	0.43	0.62	0.62	0.56	0.66	—
	k_{31}	0.32	0.34	0.19	0.31	0.25	0.37	0.37	0.33	0.39	—
	k_{33}	0.64	0.70	—	0.70	0.55	0.72	0.72	0.68	0.72	—
	k_{15}	—	0.66	—	0.66	0.65	—	—	0.60	—	—
Piezoelectric charge constants	d_{31}	−138	−169	−44	−86	−47.5	−180	−202	−119	−234	10 ^{−12} C/N
	d_{33}	292	384	—	220	100	385	438	268	480	10 ^{−12} C/N
	d_{15}	—	515	—	370	235	—	—	335	—	10 ^{−12} C/N
Piezoelectric voltage constants	g_{31}	−8.9	−10.7	−8.0	−14.0	−13.4	−11.6	−10.1	−11.2	−9.5	10 ^{−3} Vm/N
	g_{33}	18.8	24.2	—	35.4	28.2	25	22.0	25.2	19.3	10 ^{−3} Vm/N
	g_{15}	—	32.5	—	42.0	44.0	—	—	33.5	—	10 ^{−3} Vm/N
Quality factor	Q_M^E	500	80	1000	80	270	80	80	1000	50	—
Frequency constants	N_p^E	2300	2000	2460	2200	3600	2000	2000	2200	2050	Hzm
	N_1^E	1620	1460	1800	1640	2650	—	—	1620	—	Hzm
	N_3^D	2050	1850	—	2000	2900	1900	1900	2000	1950	Hzm
	N_5^E	—	930	—	970	1500	—	—	1020	—	Hzm

*Tentative figures
 †in PXE11 there is a transition from the ferroelectric orthorhombic to the ferroelectric tetragonal phase at 180 °C. If the material passes through this temperature in either direction, then it must be repoled.

PXE ceramic components





PXE piezoelectric ceramic components

preferred types book 3 part 2

Type No.	PXE	Dimensions mm	
gas ignition		dia.	length
MB1115	41	3·7	5
MB1113	41	6·35	15
MB1086, MB1112, MB1114	21, 22, 41	6·35	16

ultrasonic cleaning and welding		o.d.	i.d.	thickness
MB1116	41	38·1	—	6·35
MB2019	41	38·1	12·7	6·35
MB2021	41	38·1	19·1	6·35
MB1109	41	50	—	3

Where more than one MB type number is shown, it indicates that the component is made in more than one material but has the same physical size. Type numbers refer respectively to the materials shown.

echo sounder		dia.	length
MB1082 (operating frequency 151kHz)	41	32	14 (approx.) dependent on frequency

pick-up elements		length	width	thickness
MB8009 multimorph	5	9·6	1·6	0·68
MB8001 multimorph	5	12·7	1·6	0·68
MB8000 multimorph	5	15·5	1·6	0·68
MB8004 multimorph	5	70	1·6	0·68
MB7010 bimorph	5	8	8	0·6
MB7007 bimorph	5	11·6	6·35	0·5
MB7012 bimorph	5	12·7	1·6	0·5
MB7014 bimorph	5	15	1·6	0·6

air transducer		dia.	thickness
MB4016 (operating frequency 36kHz)	5	25	14·5

delay line transducer		length	width	thickness
MB3013 (operating frequency 4·1MHz)	7	25	10	0·24 (approx.) dependent on frequency

feedback disc		dia.	thickness
MB1000	5	16	1·1

general applications

rods and discs

Dia. mm.	Thickness/length mm.	PXE
3	0·5 to 8	5
5	0·2 to 2	5
6·35	2	21
10	0·2 to 20	5
16	0·2 to 3	5
25·4	0·5 to 2	5

plates

Type No.	Dimensions mm	PXE
MB3011	12 × 6 × 0·5	5
MB3010	12 × 6 × 1	5
MB3004	16 × 12 × 1	5



Permanent magnets

Mullard provide a service for the design and manufacture of metal (TICONAL) and ceramic (MAGNADUR) magnets to customers' specialised requirements; a comprehensive range of standard shapes and sizes is also available. Magnets may be supplied in the basic shape, cored, grooved, tapered, etc., and either unmagnetised or magnetised with a choice of magnetic axes (where no choice is available, this is shown on the appropriate outline drawing).

material properties book 3 part 2

Material	(BH) _{max}		Br		H _{cb}	
	kilojoules/ metre ³	megagauss -oersted	millitesla	gauss	kiloamperes/ metre	oersted
Ticonal 900(XX)	79.6	10.0	1080	10 800	127	1600
Ticonal 600(VC-sc)	47.8	6.0	1310	13 100	54.1	680
Ticonal 570(C-sc)	45.4	5.7	1320	13 200	51.7	650
Ticonal 550(HX)	43.8	5.5	900	9000	123	1550
Ticonal 500(C)	40.6	5.1	1250	12 500	52.5	660
Ticonal 440(H)	35.0	4.4	1160	11 600	55.7	700
Magnadur 2	28.7	3.6	400	4000	143	1800
Magnadur 5	25.5	3.2	370	3700	239	3000
Magnadur 3	22.3	2.8	350	3500	239	3000
Magnadur 4	14.3	1.8	280	2800	199	2500
*Magnadur 1	7.56	0.95	220	2200	131	1650
*Magnadur D55	4.78	0.60	170	1700	111	1400
Magnadur P40	3.58	0.45	145	1450	95.5	1200

*These materials, in their unmagnetised state, have no preferred direction of magnetic axis (i.e. isotropic).

Conversion factors: 10 gauss = 1 millitesla (mT)

1 oersted = 79.6 amperes per metre (A/m)

1 gauss-oersted = 79.6×10^{-4} joules per metre³ (J/m³) which is equivalent to the expression tesla amperes per metre (TA/m)

standard shapes and sizes book 3 part 2

Shape	Dimensions mm			Material	Figure
	a	b	c		
Rectangular section bars	5 to 400	5 to 50	5 to 25	Ticonal	1
	19 to 152	16 to 100	6 to 25	Magnadur	
Rods and discs	Ø3 to 40	5 to 76	—	Ticonal	2
	Ø1 to 30	4 to 40	—	Magnadur	
Rings and tubes	Ø6 to 190	29 to 83	Ø5 to 140	Ticonal	3
	Ø6 to 184	6 to 18	Ø3 to 73	Magnadur	
U-shapes	6 to 170	Ø9 to 180	8 to 100	Ticonal	4
C-shapes	11 to 84	38 to 178	8 to 108	Ticonal	5
Segments	40 to 65	R 23 to 37	13 to 45	Magnadur	6

For outline drawings (figs 1 to 6) see next page.



Permanent magnets

standard shapes and sizes book 3 part 2

outline drawings

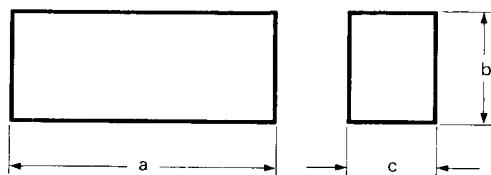


Fig. 1

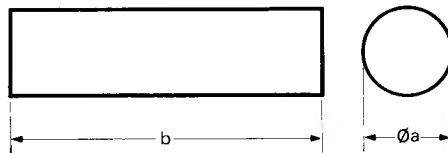


Fig. 2

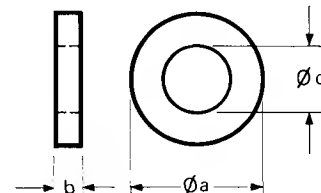


Fig. 3

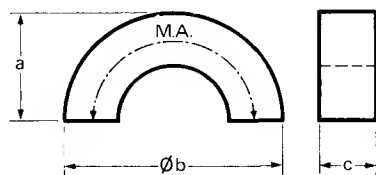


Fig. 4

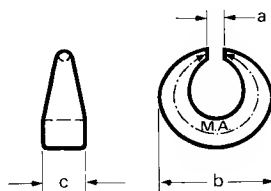


Fig. 5

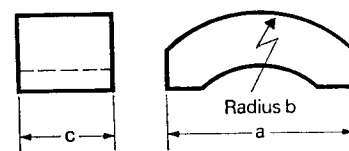


Fig. 6

M.A. = Magnetic axis

For dimensions a, b & c see previous page

plasto ferrites book 3 part 2

Two materials are available:

Magnadur D55 — available in ring form

Magnadur P40 — available in strip form: width 8 to 48 mm, thickness 1 to 4.5 mm., length up to 50 metres

Magnadur magnet powder M8 book 3 part 2

Mainly intended for use in the manufacture of plastic bonded magnetic articles which are extruded or stamped from rolled sheet.

MAGNETIC DATA

The parameters specified below are measured on a test piece.

Typical properties

	SI units	CGS units
$(BH)_{max}$	3180 J/m ³	0.4 MGs Oe
B_r	138 mT	1380 Gs
H_{cB}	87.6 kA/m	1100 Oe
H_{cJ}	191 kA/m	2400 Oe
Curie point	450 °C	450 °C

Magnadur magnets

TEST PIECE

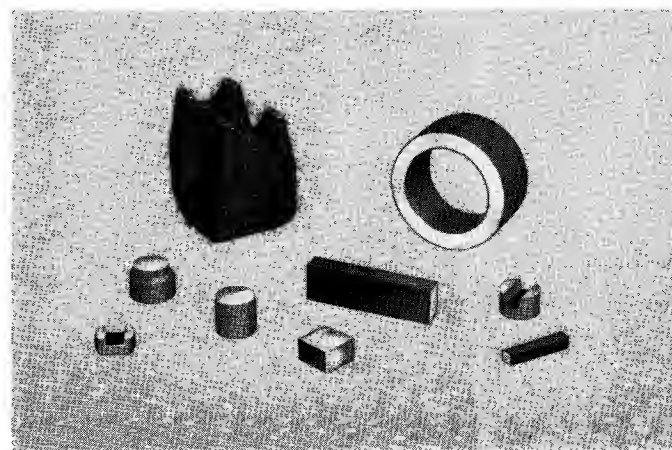
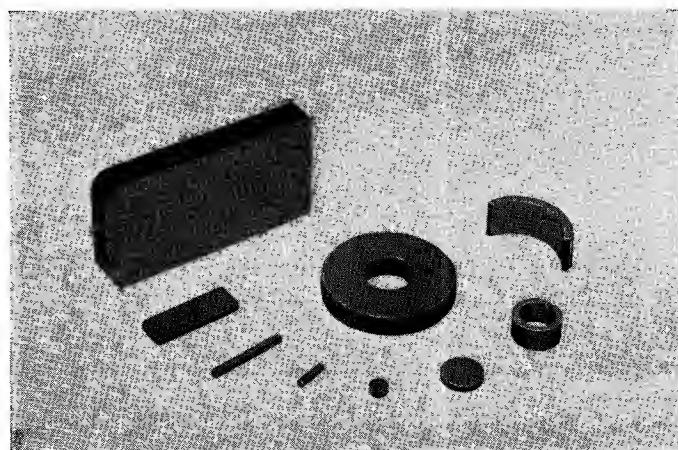
The constituents of the test piece are as follows:

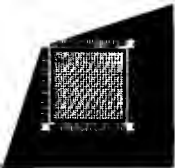
M8 powder	400 g
Bakelite resin	21 ml
Acetone solution (70% water, 30% acetone)	9 ml

From this material, a cylindrical test piece is made according to the following specifications:

Diameter	30.05/30.00 mm
Height	12.05/11.95 mm
Cured pressed density	$3.6 \times 10^3 \text{ kg/m}^3$

Ticonal magnets





Computer components

ferrite core memory systems book 3 part 2

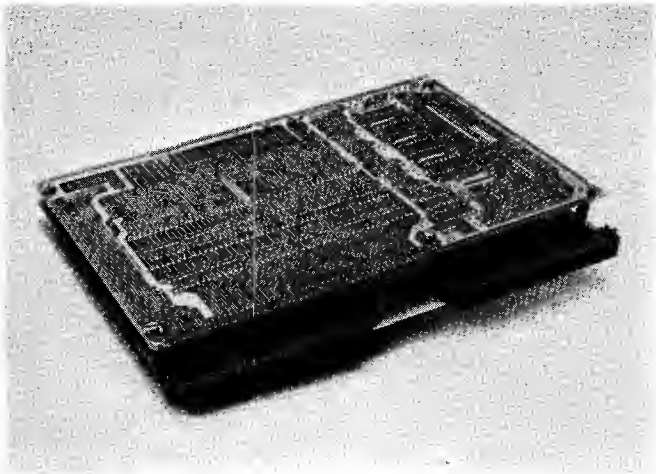
Mullard are actively engaged in the design and manufacture of ferrite core memory systems, stacks, planes and semiconductor memory systems. Whilst the standard ranges given will be satisfactory for many applications, we welcome the opportunity to discuss with customers details of systems to suit their specific requirements.

Type No.	Words	Bits per word	Cycle time	Access time
FI-2	1 024	8	4 μ s	< 700ns
MM1507	1 024	8	1.2 μ s	320ns
**FI-26	1 024	13	1 μ s	500ns
*FI-75	4 096	18	750ns	300ns
FI-128	4 096	8	1.5 μ s	600ns
FI-138	8 192	8	1.5 μ s	600ns
*FI-65	8 192 or 16 384	18 9	650ns	275ns
*Q-14	16 384	36	1.4 μ s	600 μ s

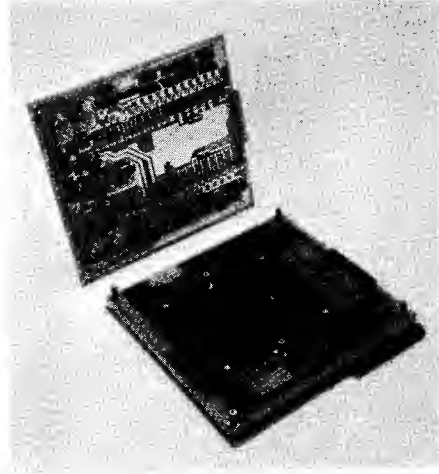
*Expansion—The capacity of these memory systems may be readily expanded in increments (of the basic capacity given above) up to a maximum of 8, by the addition of extra memory modules.

**Expansion up to 16k13

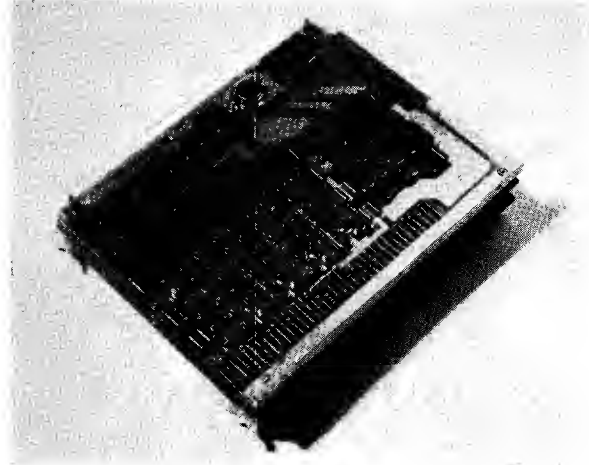
FI-26



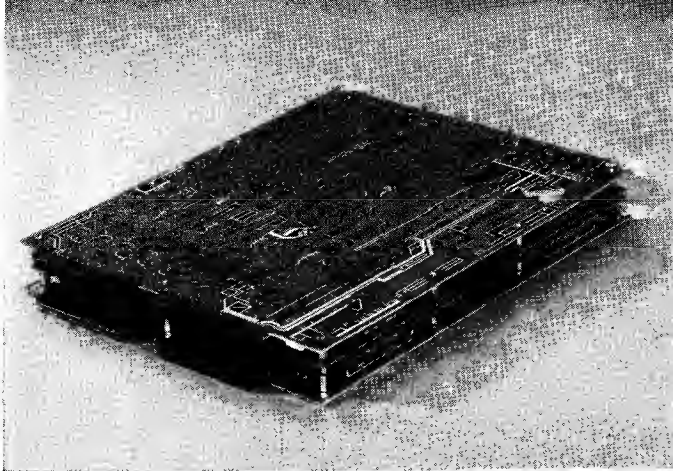
FI-128



FI-65



Q-14



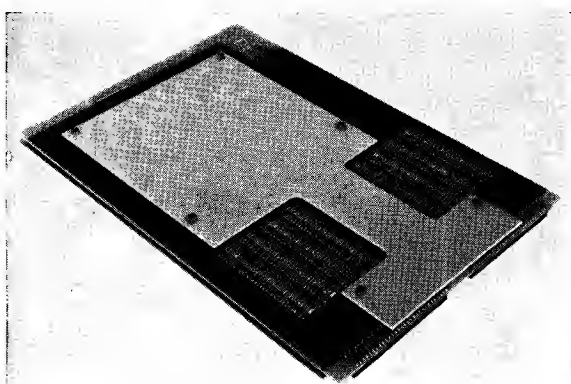


Computer components

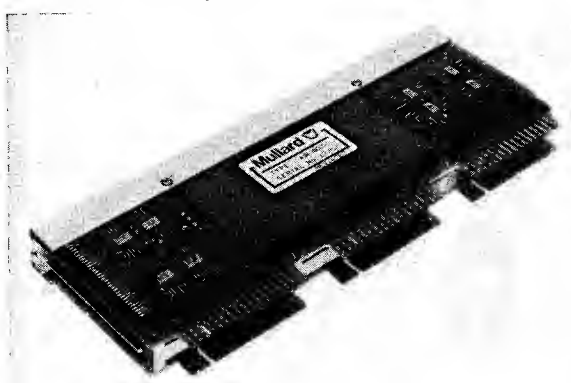
ferrite core matrix planes and stacks

A wide range of planes and stacks are produced using 3D/3W and 3D/4W techniques, with core sizes from 0.018 in to 0.030 in, and capacities up to 32k26.

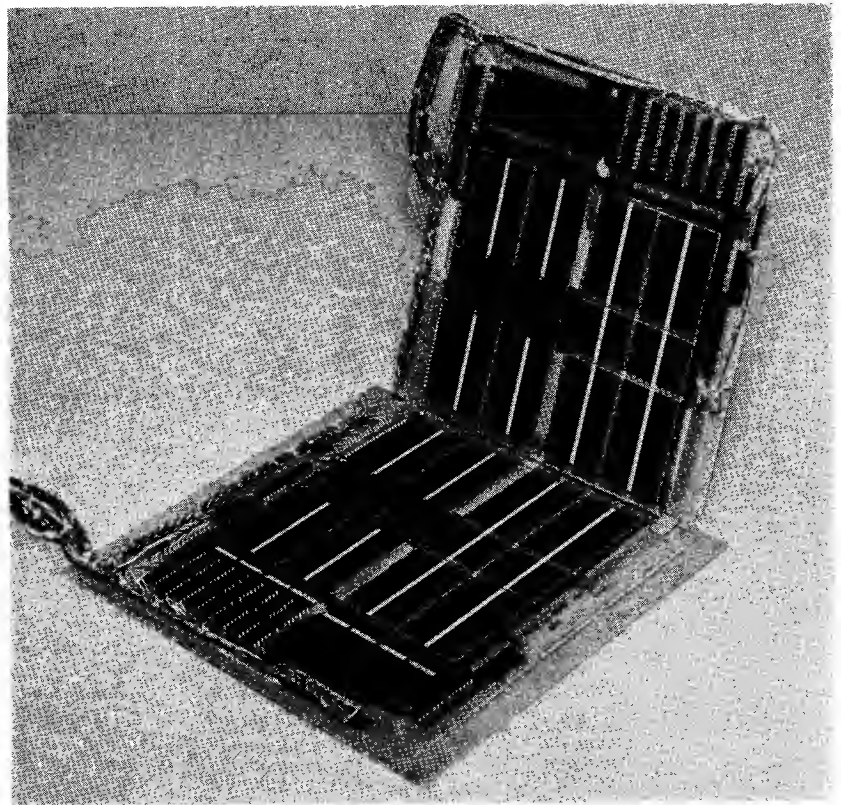
4k18 3D/3W planar



4k16 3D/4W folded planar



16k18 folded planar 0.018 in cores



We welcome the opportunity to discuss details of stacks for specific applications and operating environments.

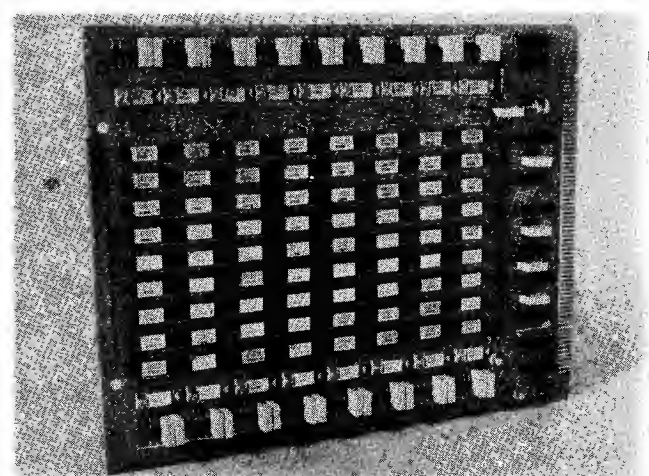
M.O.S. memory systems

We are currently supplying M.O.S. memory systems incorporating the Mullard GYQ101.

A brief summary of the system is given below. At the same time we recognise the wide range of possible specifications for such systems, and we are always interested to discuss details of specific requirements.

Capacity	4k18 expandable to 16k36	
Cycle time	600ns (refresh interrupt),	1 μ s (hidden refresh)
Access time	450ns (refresh interrupt),	700 ns (hidden refresh)

M.O.S. memory system





Wound components custom-built service book 3 part 2

Mullard provide a complete service for the design and manufacture of wound inductive components, using ferrite cores. Each component is designed and manufactured to meet customers' individual circuit requirements and thorough testing is applied at all stages of manufacture. Finishes can be supplied to meet various environmental specifications. Wherever possible, adjustment facilities are retained after finishing.

Mechanical arrangements and environmental protection

For inductors and transformers the preferred mechanical arrangements are those used for the miniature pulse transformers, the thyristor trigger transformers, RM-cores, and Vinkors. Stocks of piece parts for these mechanical arrangements are held so that a prompt return of samples, for potential bulk orders, is assured. These types of wound component can be supplied "tropicalised". For inductors and transformers, the normal processes are wax or varnish impregnation under vacuum. These processes can also be applied to L.C. filters which can, if needed, be fitted in hermetically sealed cans.

Inductors

To individual customers' specifications in the range.

Inductance up to 100H
Inductance tolerance $\pm 0.5\%$
Q values up to 1000 depending on level and frequency
Frequency up to 15MHz
Temperature range -55 to $+85^{\circ}\text{C}$

Transformers

Multi-winding transformers for wide band, pulse and blocking oscillator applications can be manufactured. Close control of matching, leakage inductance and interwinding capacitance is maintained and bifilar windings are used where balanced windings are required.

L.C. filters

L.C. filters, including low pass, high pass and bandpass filters, can be designed to meet customers' specific requirements.

Preferred types

In addition to the custom-built wound components, preferred ranges of miniature pulse transformers and thyristor trigger transformers, as described, are offered.

miniature pulse transformers preferred types book 3 part 2

WF3500 Series

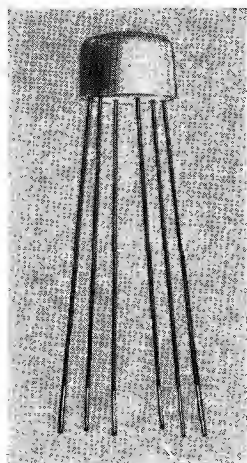
Type No.	Turns ratio	Min. primary inductance mH	Max. primary ET $V\mu\text{s}$
WF3500	1:1:1	0.1	4.4
WF3501		0.2	6.2
WF3502		0.5	9.8
WF3503		1	14
WF3504		2	20
WF3505		5	31
WF3506		10	44
WF3507		20	62
WF3508	1:2:2	0.1	4.4
WF3509		0.2	6.2
WF3510		0.5	9.8
WF3511		1	14
WF3512		2	20
WF3513		5	31
WF3514		10	44
WF3515		20	62

Type No.	Turns ratio	Min. primary inductance mH	Max. primary ET $V\mu\text{s}$
WF3516	1:5:5	0.1	4.4
WF3517		0.2	6.2
WF3518		0.5	9.8
WF3519		1	14
WF3520		2	20
WF3521		5	31

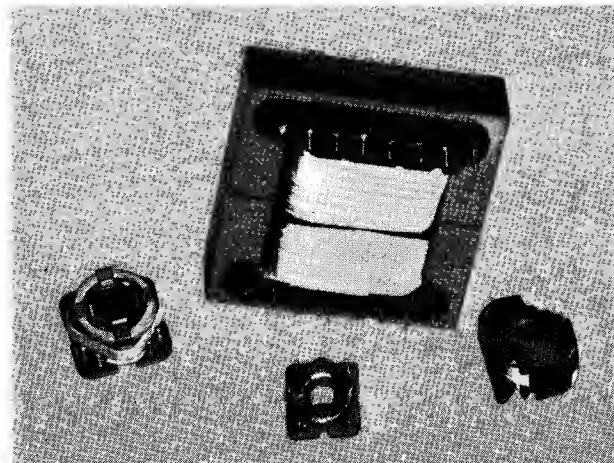
WF4500 Series

Type No.	Turns ratio	Min. primary inductance mH	Max. primary ET $V\mu\text{s}$
WF4500	1:1	0.1	2.4
WF4501		0.2	3.3
WF4502		0.5	5.4
WF4503		1	7.5
WF4504		2	10
WF4505		5	16
WF4506		10	23
WF4507		20	33

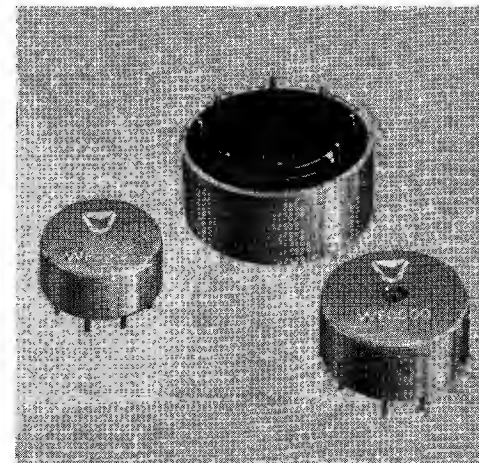
Miniature pulse transformer



Custom-built wound assemblies



Thyristor trigger transformers





Wound components

miniature pulse transformers (cont.)

preferred types book 3 part 2

NF4500 Series—continued

Type No.	Turns ratio	Min. primary inductance mH	Max. primary ET $V_{\mu s}$	Type No.	Turns ratio	Min. primary inductance mH	Max. primary ET $V_{\mu s}$
WF4508	1:2	0.1	2.4	WF4548	1:4:4	0.1	2.4
WF4509		0.2	3.3	WF4549		0.2	3.3
WF4510		0.5	5.4	WF4550		0.5	5.4
WF4511		1	7.5	WF4551		1	7.5
WF4512		2	10	WF4552		2	10
WF4513		5	16	WF4553		5	16
WF4514		10	23	WF4554		10	23
				WF4555		20	33
WF4516	1:3	0.1	2.4	WF4564	2:1:1	0.1	2.4
WF4517		0.2	3.3	WF4565		0.2	3.3
WF4518		0.5	5.4	WF4566		0.5	5.4
WF4519		1	7.5	WF4567		1	7.5
WF4520		2	10	WF4568		2	10
WF4521		5	16	WF4569		5	16
WF4522		10	23	WF4570		10	23
WF4523		20	33	WF4571		20	33
WF4524	1:4	0.1	2.4	WF4572	3:1:1	0.1	2.4
WF4525		0.2	3.3	WF4573		0.2	3.3
WF4526		0.5	5.4	WF4574		0.5	5.4
WF4527		1	7.5	WF4575		1	7.5
WF4528		2	10	WF4576		2	10
WF4529		5	16	WF4577		5	16
WF4530		10	23	WF4578		10	23
WF4531		20	33	WF4579		20	33
WF4532	1:5	0.1	2.4	WF4580	4:1:1	0.1	2.4
WF4533		0.2	3.3	WF4581		0.2	3.3
WF4534		0.5	5.4	WF4582		0.5	5.4
WF4535		1	7.5	WF4583		1	7.5
WF4536		2	10	WF4584		2	10
WF4537		5	16	WF4585		5	16
				WF4586		10	23
				WF4587		20	33
WF4540	1:3:3	0.1	2.4	WF4588	5:1:1	0.1	2.4
WF4541		0.2	3.3	WF4589		0.2	3.3
WF4542		0.5	5.4	WF4590		0.5	5.4
WF4543		1	7.5	WF4591		1	7.5
WF4544		2	10	WF4592		2	10
WF4545		5	16	WF4593		5	16
WF4546		10	23	WF4594		10	23
				WF4595		20	33

Mechanical details of WF3500 and WF4500 Series:

Body diameter 9.6 mm max; body height 6.8 mm max; lead length 38 mm min; climatic group (to DEF 5011) H5, T3, GP2

thyristor trigger transformers book 3 part 2

Wound on Mullard Ferroxcube pot cores. Four windings, primary, feedback and two outputs are provided having turns ratios 2 : 1 : 1 : 1

Type No.	Core size mm	Min. primary inductance (mH)	Max. primary ET ($V_{\mu s}$)	Type No.	Core size mm	Min. primary inductance (mH)	Max. primary ET ($V_{\mu s}$)
WF3806	14	10	400	WF3809	25	10	1000
WF3807	14	30	700	WF3810	25	30	1700
WF3808	14	100	1300	WF3811	25	100	3000

For the transformers using 25 mm cores, body diameter 39.6 mm max, seated height 20.3 mm max.

For the transformers using 14 mm cores, body diameter 24.6 mm max, seated height 13.2 mm max.

Mullard

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London WC1E 7HD
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Birmingham 021-236 8541 : Gothic Electronic Components Ltd., Beacon House, Hampton St., Birmingham 19
Birmingham 021-359 4301 : Hawnt Electronics Ltd., 112/114 Pritchett St., Birmingham B6 4EN
Bristol 0272 294313 : Black Arrow Electronics Ltd., Wirelect House, 122/123 St. Thomas St., Bristol BS1 6JW
Crawley 0293 28700 : SASCO Ltd., P.O. Box 2000, Gatwick Road, Crawley, Sussex RH10 2RU
Leeds 0532 636311 : Farnell Electronic Components Ltd., Canal Road, Leeds LS12 2TU
Leicester 0533 768561 : Townsend-Coates Ltd., Coleman Road, Leicester LE5 4LP
London 01-237 0404 : Edmundson Electronic Components Ltd., Cowley House, 30/50 Ossory Road, London SE1 5AN
Reading 0734 582211 : Celdis Ltd., 37/39 Loverock Road, Reading, Berkshire RG3 1ED
Rochdale 0706 47411 : Swift Hardman Ltd., P.O. Box 23, Hardale House, Baillie St., Rochdale, Lancs. OL16 1JE